SELF-AFFIRMATION AND THE PROCESSING OF HEALTH-RISK INFORMATION

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ABSTRACT

Four studies investigated the effects of self-affirmation (Steele, 1988) on the processing of health-risk information. Prior to being presented with health information, participants completed either a control or self-affirmation task focusing them on their values or strengths. Study 1 found self-affirmation promoted acceptance of the personal implications of health information targeting female students' alcohol consumption. Self-affirmed participants reported greater risk perceptions, negative affect and intentions to reduce alcohol intake. Differences were maintained up to one-month later. Study 2 describes the development of a practical self-affirmation technique, rooted in contemporary thinking about values. Using this technique, Study 3 found evidence that self-affirmation promoted orientation to threatening health information, and was associated with a reduction in an unhealthy behaviour. Self-affirmation was not found to influence effort applied to message processing. Study 4 investigated participants' sensitivity to argument strength. Rather than self-affirmation reducing biased processing, self-affirmation was associated with less inductive processing and sensitivity to message strength. Study 5 examined whether the effects of self-affirmation were mediated by changes in processes identified by models from the fear appeal literature. Self-affirmation was found to increase intentions and behaviours aimed at adopting a healthy behaviour. Overall, three of the four studies provided evidence suggesting that affirming the self in a domain unrelated to health reduced biased processing of health information. This reduction in biased processing appeared to be associated with systematic rather than heuristic processing. The effects of self-affirmation were not mediated by a reduction in negative affect or increases in coping appraisals. Self-affirmation may have the potential as an applied technique, with evidence in the present thesis that it is associated with durable changes in persuasion, and effective for both those low and high in self-esteem. Further research is needed to establish possible moderators of the effects of self-affirmation.

> "I don't drink enough [alcohol] for it to affect my health. I won't drink this much when I'm older anyway. Breast cancer happens to older people. I won't be one of the 2,000 deaths."
>
> "There might not be a definite link [between alcohol and breast cancer], it could be something else. They probably changed or used figures that suited them."
>
> "I drink too much alcohol, but other students do too. Other factors must have a more significant role in developing breast cancer anyway. I'm sure I'll drink less when I'm not a student."
>
> "I know I should reduce my alcohol intake but it's easier said than done. I will probably just repress what I've read or something".
>
> "How can there be a link? It'll just be estimates. I'm sceptical, but maybe it's because I don't want to believe it. I don't want to see myself as putting myself at risk."

Reactions of female students to information that their high level of alcohol consumption could be putting them at risk of breast cancer.

These women's responses to negative, personally-relevant health information provide an illustration of people's attempt to ward off unwelcome health information. When faced with information that their drinking behaviour could be putting their health at risk these women denied or minimised the impact of the message. Denial and minimisation of risk may have consequences for people's behaviour and health, for example, preventing them from changing their unhealthy behaviour and reducing their risk. The present chapter will outline evidence that people respond differently to negative, personally-relevant health information, before reviewing explanations that have been applied to understanding why people sometimes reject relevant health messages that could have potential benefits for health. The final section of this chapter will discuss self-affirmation theory (Steele, 1988) as an explanation for why people resist certain types of health information, and will discuss evidence for the theory.

How do people process personally relevant health-risk information?

People respond to health-risk information differently dependent upon whether this information is personally relevant to them (Berkowitz & Cottingham, 1960;

Liberman & Chaiken, 1992). For instance, Kassarjian and Cohen (1965) demonstrated that smokers, in comparison to non-smokers, were less persuaded by the Surgeon General's report outlining the health risks associated with smoking. This effect has been replicated by a variety of other studies. Kunda (1987; Study 3) provided men and women with a health message about the increased risk of fibrocystic disease (FBD) and breast cancer as a result of caffeine consumption. Male participants, who are unlikely to experience FBD or breast cancer and thus for whom the message was less relevant, were equally convinced by the information regardless of their caffeine consumption. In contrast, women who consumed high levels of caffeine and for whom the message was relevant were less convinced by the message than women who drank low levels of caffeine. Conversely, when low caffeine consumers were told caffeine could help prevent the disease, this group were least persuaded by the information (Sherman & Kunda, 1989; cited in Kunda, 1990). Liberman and Chaiken (1992) investigated the effects of personally-relevant health information using a similar message outlining the evidence for and against the risks of caffeine associated with FBD. Participants were presented with either a strong version of the message, indicating the majority of evidence was in favour of a link, or a weaker version, which suggested there was more evidence contrary to the link. High caffeine drinkers, for whom the message was relevant, were less likely to believe in the link, independent of whether they received the strong or weaker version of the message. Low relevance participants also reported the information describing the link between FBD and caffeine as superior to the information against the link, whereas higher risk participants did not. Furthermore, while low relevance participants reported that the risk-confirming and risk-disconfirming information did not differ in terms of number of weaknesses, high-risk participants saw more weaknesses in the risk-confirming information. The pattern of results suggests that when a negative health message is personally-relevant, participants report being less persuaded by the information.

Studies using feedback on medical tests have also provided evidence that people process information differently when it suggests they are at risk of a disease, compared with when it suggests they are not at risk (Croyle & Sande, 1988; Ditto, Jemmott, & Darley, 1988; Ditto & Lopez, 1992; Jemmott, Ditto, & Croyle, 1986). Jemmott et al. (1986) asked participants to take a fictitious Thioamine Acetylase

(TAA) enzyme saliva test. Results of the test were supposedly indicative of the likelihood of experiencing a range of pancreatic disorders. Personal relevance of the test results was manipulated by varying whether participants' results indicated they did or did not have TAA enzyme deficiency. Those who received results suggestive of a deficiency rated the health threat as less serious, and rated the test as less accurate. Ditto and Lopez (1992) also demonstrated that when participants were told they had a deficiency they were more likely to question the validity of the test (see also Croyle, Sun, Louie, 1993), spent more time examining their enzyme test strips, and attempted more often to retest themselves, than those whose results indicated no deficiency was present. These differences on behavioural measures may indicate that at-risk participants were less trusting of their test results. A variety of other studies, either using the TAA paradigm (Croyle & Sande, 1988), feedback on blood pressure (Croyle, 1990), or cholesterol tests (Croyle et al., 1993), have also found that participants who receive feedback indicating that they are at greater risk of a health disorder tend to rate the disorder as less serious than those who are told they are not at risk.

Participants who receive personally-relevant health risk information have also been shown to differ in their recall of this information. Croyle, Sun, and Hart (1997) examined errors in recall of cholesterol test results. They found that participants who received test results that suggested that they were at greatest risk were more likely to inaccurately recall their cholesterol to be more desirable than it actually was, both in terms of their actual cholesterol level and the risk that this level implied.

This pattern of responses has also been found to be moderated by how severe the health risk presented is. For instance, Kunda (1987, Study 4) examined the impact of reducing the level of threat upon differential processing of relevant and non-relevant messages. Kunda reduced the severity of the FBD health risk by describing the disorder as a common condition that some doctors argued should not be considered a disease at all. When severity of the condition was lower, higher and lower risk women did not differ in how convincing they perceived the risk information to be. Janis and Feshbach (1953) also demonstrated that the severity of a health message influences message evaluation and acceptance. When participants received a health message outlining the risks of tooth decay, participants who received the message portraying

the risks as more serious, and more personally relevant, were least persuaded to change their behaviour.

Research examining evaluation of other forms of negative, personally-relevant information provides a similar pattern to that of health information. For instance, studies examining what impact failure on an IQ or social sensitivity test has upon people's evaluation of the test indicate that people who score poorly rate the test as less valid, than those who receive favourable results (Pyszczynski, Greenberg, & Holt, 1985; Wyer & Frey, 1983). These effects are not limited to how people evaluate information. For instance, being provided with negative, personally-relevant information about one's personal traits (e.g., informing an extrovert that extraversion is associated with poor academic success) can influence the way in which participants evaluate themselves on that trait (Kunda & Sanitioso, 1989), or what memories they generate (e.g., more introvert or extrovert) (Sanitioso, Kunda, & Fong, 1990). People respond differently to negative, personally-relevant information, whether it be in relation to health or another aspect of the self, in comparison to non-personally relevant, or favourable information.

The pattern of responses to negative, personally-relevant health information, including the reduction in belief in the message, questioning the validity of the information and minimising the severity of the threat, particularly for severe threats, is both concerning for those attempting to develop effective health interventions, and of theoretical interest. Why do people appear less persuaded by messages when they are personally relevant and could have the potential to improve their health?

Why do people respond differently to negative personally-relevant information?

The evidence outlined above has been used to argue that people demonstrate a bias in the way in which they process negative, personally-relevant health information (Chaiken et al., 1996; Giner-Sorolla et al., 1997; Kunda, 1990). This bias in processing is characterised by negative, personally-relevant information being evaluated more harshly, and the implications of the information being minimised. Why people respond in such a way still remains a controversial topic, with some emphasising the role of motivational factors (e.g., people process information with a goal to maintain favourable evaluations of the self) and others cognitive factors (e.g., expectations, prior beliefs). The following sections outline these two accounts, before examining

models from the fear appeal literature and how these have been applied to understanding rejection of health information.

Motivational accounts of biased processing of health messages

Until the 1980s dual-processing models of persuasion, such as the Heuristic-Systematic Model (HSM, Chaiken, 1980, 1987) and the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986), assumed that people processed information with the goal of forming objective and accurate beliefs and attitudes. Drawing on evidence of biased processing of information (Kunda, 1990) the authors of these models recognised that accuracy may not always serve as the primary goal when processing information. Chaiken and colleagues (e.g., Chaiken, Giner-Sorolla, & Chen, 1996) subsequently developed a multiple motive framework for understanding processing of information, and alongside the desire to be accurate they included the motives of defence and impression management. Defence motivation has been used to account for biased processing of health information. Chaiken et al. (1996) defined defence motivation as "The desire to hold attitudes and beliefs that are congruent with existing self-definitional attitudes and beliefs." (Chaiken et al., 1996, p. 557). Self-definitional beliefs and attitudes are those closely related to important aspects of the self, including values, social identities, attributes and interests (Chaiken et al., 1996). Those motivated to respond defensively do not primarily seek to hold an accurate view of the world or self, but process information in such a way as to maintain their prior beliefs and attitudes. Petty and Cacioppo's (1981) ELM also distinguishes relatively objective or biased processing. They describe someone engaged in biased processing as "motivated or able to generate a particular kind of thought, often in defence of an initial attitude" (Petty & Cacioppo, 1986, p. 45).

Chaiken and colleagues assume that negative, personally-relevant health information is processed in a biased manner because it is incongruent with people's beliefs about their own health. One's own health is argued to form an important self-conception (Giner-Sorolla & Chaiken, 1997). Croyle et al. (1997) argue that people view health not only as a goal (e.g., "I want to be healthy") but as a value (e.g., "being healthy is important and good"). Consequently, Croyle et al., propose that people desire to see themselves as healthy, and information incongruent with this belief is defended against. Thus the motivated account of biased processing suggests that a

health message threatens beliefs about one's health and is processed in such a way as to maintain prior beliefs and reduce the perceived threat to self-conceptions. Thus negative, personally-relevant messages are argued to be "threatening" (Liberman & Chaiken, 1992). By processing threatening health information to maintain self-conception, for example by denying or distorting the information, the threat to self-conceptions is reduced, even though the actual danger to health is not reduced (Hogan, 1952; cited in Lazarus, 1966).

Models such as the Heuristic-Systematic Model outline how defence motivation may influence information processing. The Heuristic-Systematic Model proposes that information processing occurs at two concurrent levels, a relatively effortless heuristic level and a more effortful systematic level. When information is processed heuristically, judgemental rules or "heuristics" are activated. For example, a person may make judgments about the reliability of information based on learnt rules, such as "experts can be trusted" or "message length implies strength of arguments". Heuristic processing provides a relatively low cognitively demanding means of processing information.

Systematic processing involves more in-depth examination of the content of the information; this form of processing is more analytical, comprehensive and effortful (Chaiken et al., 1996). Whether people engage in systematic processing will depend on both the motivational factors (e.g., personal involvement with message) and their capacity to process a message in detail (e.g., time or resources).

Chaiken and colleagues (Chaiken et al., 1996, Chen and Chaiken, 1999) suggest that both heuristic and systematic processing can be governed by defence motivation. In the case of the heuristic mode, a defence motive may influence the selectivity of which heuristics are applied. For example, heuristics that favour the desired outcome will be applied over those that do not (Giner-Sorolla & Chaiken, 1997). Furthermore, participants may apply an heuristic that information that is incongruent with personal beliefs, values or attitudes is invalid (Liberman, de la Hoz, & Chaiken, 1988).

Participants have also been shown to demonstrate selectivity in the amount of processing they apply to a health message (Chaiken et al., 1996). Participants may avoid processing a negative personally-relevant message in-depth and engage in

attentional avoidance. Both cognitive and behavioural distractions can be used to avoid comprehending a threatening message (Blumberg, 2000). This form of avoidance is characterised by both inattention to the message and reduced recall of the content (Chaiken, Giner-Sorolla, & Chen, 1996).

Alternatively, defence-motivated participants are hypothesised to apply more effort to processing a threatening message (Chaiken et al., 1996). When defence motivation and cognitive capacity are both high, participants may engage in biased systematic processing. Defence-motivated participants may selectively process information by applying greater scrutiny and engaging in more counter-arguing of information contrary to prior beliefs or values (Liberman & Chaiken, 1992). A defence motivation is also argued to lead to avoidance of personal inferences, such that a person is able to accept a health risk is true, but stop short of accepting that the message has personal implications (Blumberg, 2000). Consistent with the literature on defensive processing, the coping literature also describes a variety of strategies, including denial and rationalisation that can be employed to minimise the impact of negative, personally-relevant information (Lazarus & Folkman, 1984; Pearlin & Schooler, 1978).

The motivated account of biased processing acknowledges that there are limits to the effects of defence motivation on information processing. Kunda (1990) suggests that biased responses will be constrained by information and participants' prior beliefs and knowledge. For instance, a weak message will be easier to defend against than a message presenting very strong evidence that a participant is at risk (Petty & Cacioppo, 1986). Das, de Wit, and Stroebe's (2003) Stage Model of processing health messages, drawing upon Chaiken (1980) and Petty & Cacioppo's (1986) dual processing models, predicts that when health information threatens a participant's self-conceptions a defence motivation will be aroused, leading to biased systematic processing. They argue that health information will only be accepted if constraints of the information and rules of inference make biased systematic processing unsuccessful.

The motivated processing account suggests that when people encounter a negative, personally-relevant health message they may not process the message with a goal of accuracy, but instead be motivated to defend important self-conceptions. This

motivated processing leads to biases in participants' response to the health message, and ultimately to less persuasion and behaviour change (Janis & Feshbach, 1953; Liberman & Chaiken, 1992).

Non-motivational accounts of biased processing of health messages

Non-motivational accounts have also been applied to understanding why people process health information differently when it is negative and relevant. The quantity-of-processing (QOP; Ditto and Lopez, 1992; Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998) perspective of motivated processing suggests that biased processing may not be a result of people simply believing what they want to believe, but a result of the amount of attention applied to processing the message. Ditto and Lopez (1992) suggest that it is adaptive for organisms to direct more attention and effort to processing information that is negative or preference-inconsistent, than information that is favourable, or preference-consistent. Thus more critical evaluations of preference-inconsistent information (e.g., "you are at risk"), rather than preference-consistent information (e.g., "you are not at risk") results from more intense cognitive processing, which in turn leads participants to be more sensitive to flaws in the health message.

Renner's (2004) cue adaptive reasoning account (CARA), extends the QOP perspective and provides a non-motivational account of biased processing by suggesting that expectations about health information could account for biases in processing. Renner suggests that unexpected information, either negative or indeed positive, will receive greater scrutiny, which in turn leads to more critical evaluation. Indeed, Renner demonstrated that both unexpected positive or negative personally-relevant information undergoes greater cognitive processing and is viewed as less accurate. Non-motivational accounts of biases in processing of information suggest that negative, personally-relevant information contradicts participants' prior beliefs and expectations about their health. Consequently, the information receives greater attention, increasing the likelihood of flaws in the information being identified, and ultimately leading to reduced belief in the message and persuasion.

According to non-motivational accounts of biased processing, personally-relevant and negative health information tends to be rejected, not because it threatens deeply held self-conceptions, but as it is unexpected and receives greater attention.

Models of processing fear appeals as accounts of biased processing of health messages

As well as motivational and non-motivational accounts of health information processing, the literature examining the processing of fear appeals has also highlighted affective and cognitive factors that may account for why people reject a relevant health message.

More severe health threats have been found to be associated with greater fear and less persuasion (Janis & Feshbach, 1953). This finding has led some researchers to suggest that fear could motivate defensive responses to health messages (Hovland, Janis, & Kelly, 1953; Janis, 1967; McGuire, 1968, 1969). According to Hovland et al.'s (1953) *Drive Reduction Model* of persuasion, participants are motivated to reduce fear associated with a personally-relevant health message, and if processing of the recommendations of the health message (e.g., what can be done to reduce the risk) fail to reduce fear then people may spontaneously engage in defensive cognitions to reduce the fear by another means.

Though later models (Janis, 1967; McGuire, 1968, 1969) also suggest low levels of fear may have a positive impact for message persuasion, when a message arouses high levels of fear this is seen to interfere with message acceptance, leading to biased processing of the message. However, evidence for fear reduction models of persuasion is weak (Sutton, 1982; Witte, 1992), leading to alternative models placing less emphasis on fear as a motivational factor and more emphasis on cognitive antecedents of message acceptance. Leventhal's (1970) *parallel process model* provides one such account. This model describes two simultaneous processes, *fear control* and *danger control.* Danger control involves processes aiming to deal with the actual danger rather than participants' perceptions of the threat. Fear control does not resolve the actual danger, but involves actions and cognitions targeting the fear experienced, for example reappraisal of the threat. Unlike the early drive models the parallel process model suggests adaptive responses to a threat need not be driven by fear, but have their basis in danger control.

Further research has elaborated on Leventhal's model, with expectancy-value theories, such as Sutton's application of the subjective expected utility theory (SEU; 1982) and Roger's (1975, 1983) protection motivation theory (PMT). In comparison to

parallel process model, these theories place an even greater emphasis on the role of cognitions in acceptance of health messages. Assuming people are rational processors, Sutton argues that the decision to accept a health message or reject it is based on three factors: the utility of the threat (e.g., the value attached to the outcome, with an unfavourable outcome having negative utility), and the subjective probability of the negative outcome occurring if the person takes no action, or the likelihood if they follow the recommended action. Put simply, the model predicts that for a person to be persuaded to take action by a health message they must first believe the outcome of taking no action is negative and that they will be less likely to experience this negative outcome if they take action. Motivational factors, such as fear, are not directly incorporated into the model. Thus, according to this approach message rejection is not a result of a desire to maintain positive self-conceptions, but is mediated by people's cognitions about the health risk and their behaviours to reduce the risk.

Roger's (1975, 1983) PMT similarly provides a cognitive account of processing of health messages. In its original version PMT identified vulnerability to the negative outcome, severity of the outcome, and perceived efficacy of the person to carry out the recommended action as key cognitive variables mediating the impact of health threats. Self-efficacy was later broken down into self-efficacy, one's perceived ability to carry out the behaviour, and response efficacy, the effectiveness of the action to reduce the threat (Maddux & Rogers, 1983). These cognitive variables generated protection motivation, "an intervening variable that has the typical characteristics of a motive: it arouses, sustains, and directs activity" (Rogers, 1975, p. 98), operationalised as intentions to adopt a health behaviour or reduce an unhealthy behaviour. High levels of each of the four components are proposed to lead to greater message acceptance.

A revised version of PMT (Rogers, 1983) included the further cognitive mediating processes of perceived rewards of the maladaptive behaviour and costs of adaptive behaviour, and distinguished between threat and coping appraisals. This expanded version of the theory proposes that when threat appraisals (e.g., perceptions of severity and vulnerability) are high, but coping appraisals (self- and response-efficacy) are low, such that a person perceives themselves at risk of a serious health threat but can do little about it, no intention to change will occur.

Though PMT acknowledges that fear can act both as a precursor and a consequence of threat perceptions, fear arousal is no longer seen as a motivational force in determining message rejection or acceptance. This emphasis on cognitive, rather than affective responses to threat, has been argued to be a limitation of models aiming to examine what moderates message acceptance, and may help to account for why such models have received only partial support (Witte, 1992). One model that has attempted to tackle this lack of acknowledgement of the role of affect is Witte and colleagues' (1992, 1994, 2000) Extended Parallel Process Model (EPPM). The EPPM is founded in Leventhal's parallel process model, using the concepts of danger and fear control. EPPM predicts that when a health threat is encountered people firstly appraise the threat and then their coping resources. When perceptions of threat (vulnerability and severity) are high, people experience fear and then are motivated to appraise their self- and response-efficacy. If both coping and threat appraisals are high danger control should be initiated, with people generating adaptive responses to directly reduce the danger. However, if threat appraisals are high, but coping appraisals are low, fear control should be initiated, with people generating defensive responses to reduce the threat without reducing the danger. Witte and Allen (2000) conducted a meta-analysis of fear appeals and found evidence in support of the EPPM. Consistent with the EPPM, stronger fear appeals elicited stronger fear control, as did weaker efficacy messages. High threat / high efficacy messages were also found to be the most effective for persuasion. However, the interaction of threat and efficacy was not significant. In fact, the findings were more consistent with Sutton's SEU model. Witte and Allen conclude that currently the evidence does not support one model over another.

Currently, models of fear appeals appear inadequate at predicting when biased processing and message rejection will occur. In a review of fear appeals, Ruiter, Abraham, and Kok (2001) suggest that the lack of clarity in the use of the terms threat and fear may help to account for inconsistencies within the literature. Ruiter et al. argue that fear directly generates fear control processes, such as denial or rationalisation in response to health risk information, independent of threat appraisals. Furthermore, fear can influence both threat appraisals and attention to efficacy information. Ruiter et al. suggest that affect comprises a primary and automatic

response to health messages. In their re-conceptualisation of the effects of fear appeals fear, independent of threat, is seen to mediate the effects of fear appeals on message acceptance.

Das, de Wit, and Stroebe's (2003) stage model of fear-arousing communications is one account that has incorporated concepts from fear appeal research (coping appraisals and threat appraisals) with dual-process theories of attitude change (HSM, Chaiken, 1980, 1987; ELM, Petty & Cacioppo, 1986). Das et al. suggest that defensive processing is a result of health messages forming threats to important self-conceptions, rather than a response to fear. Unlike the models discussed above, Das et al. also predict that threat appraisals will predict depth of processing (e.g., if a person feels vulnerable and the threat is severe they will engage in more systematic processing). The stage model will be discussed in more detail in Chapter 7, as it was published since the start of the research programme in 2002.

Research aiming to understand what predicts the effectiveness of fear appeal is currently inconclusive about the mediating roles of affective and cognitive variables. For example, it is unclear whether threat appraisals and coping appraisals interact to predict message acceptance and what effect, if any, affect has on message acceptance. Setting aside these unresolved issues, these models of processing fear appeals complement the motivational and non-motivational accounts of biased processing, highlighting factors that may be important in mediating message acceptance.

Self-affirmation theory

Whether biases in the processing of personally-relevant health information are a result of non-motivated or motivated processes remains contentious. The aim of the present thesis was to test the implications of one specific motivational account of biased processing of health information, that of self-affirmation theory. Self-affirmation theory predicts that people are motivated to defend against negative, personally-relevant health messages as they form a threat to a person's self-integrity. Steele (1988) describes self-integrity as a sense of the self as "adaptively and morally adequate, that is, competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes, and so on." (p. 262). Self-affirmation theory suggests that people are motivated to maintain this positive experience of the self.

Self-affirmation theory (Steele, 1988) developed out of the dissonance literature (Festinger, 1957). Festinger's work identified the need for consistency between attitudes, behaviour and beliefs as a key motivator in persuasion and decision-making. If a health message led to inconsistencies between participants' beliefs and behaviour, for example, choosing to smoke cigarettes even though there are clear and well-established health risks associated with the action, this inconsistency could lead to rationalisation, denial and in some cases changes in behaviour. Festinger argued that it was this need for consistency that could motivate defensive reactions.

Steele argues that people are more resilient in dealing with threats to the self than Festinger originally assumed. Steele suggests that people are able to engage in strategies to reduce a threat without directly tackling the inconsistency itself. Steele proposed that it is not the inconsistency that triggers the use of defensive strategies, but the fact that inconsistencies are one form of threat to people's perceptions of themselves as good, competent and morally adequate. For example smoking while acknowledging the increased risk of disease, threatens the view of the self as competent, adequate and adaptive.

Steele argues that it is not the need to reduce the inconsistency per se, but the need to restore a positive experience of the self that drives processes such as denial, rationalisation or attitude change. These processes in themselves act as self-affirmations, re-establishing perceived self-integrity or adequacy of the self. For instance, by denying the potential risk to health, or minimising the personal implications of a health message, the threat to self-integrity is reduced and a positive view of the self is maintained.

Though self-affirmations in the form of defensive reactions can have a negative impact for acceptance of a relevant health message, the theory also suggests that self-affirmation can promote self-objectivity. Steele proposes that affirming one's self in a domain unrelated to a threat provides an alternative route to restore perceived self-integrity and to reduce the need to engage in other self-affirming strategies, such as denial or rationalisation of the threat itself.

Self-affirmation can take many forms. Steele argues that affirming any important and valued self-concept (e.g., traits, values, identities and so on, Markus and Wurf, 1987) will act to restore one's self-integrity. Affirming one's values, or the

moral principles and standards one considers to be desirable (Chambers English Dictionary, 1990), has provided a particularly popular technique of self-affirmation (Koole, Smets, van Knippenberg, & Dijksterhuis, 1999; Sherman, Nelson & Steele, 2000; Spencer, Fein & Lomore., 2001; Steele & Liu, 1983; Tesser & Cornell, 1991). The concept that affirming one's values may have consequences for the self is not new. Katz (1960) argued that attitudes can hold a value-expressive function, and the act of expressing core aspects of the self can affirm these self-conceptions. Rokeach (1980) suggests that values function to maintain and enhance self-conceptions important for facilitating social relationships. Greenwald (1989) indicates that values may act as a means of enhancing self-regard, for example, when core values are met or exceeded, whereas failing to meet one's values can have a negative effect for one's self-concept (Julka & Marsh, 2000). Though value affirmations provide a popular means of self-affirming, more broadly any behaviour or cognition that acts to restore self-integrity can be affirming. For example, as described above, biased processing of a health threat could act as a self-affirmation (Steele, 1988, p. 290). Chapter 3 looks in more detail at what constitutes an effective affirmation.

Evidence for self-affirmation theory

The first tests of self-affirmation theory focused on the use of dissonance paradigms. Steele and Liu (1983) reasoned that if dissonance is a result of a threat to self-integrity, then providing participants with an opportunity to affirm an unrelated self-concept should reduce dissonance. If, however, dissonance is a result of a perceived inconsistency, affirming an unrelated aspect of the self that does not resolve this inconsistency should have no effect. Steele and Liu found evidence consistent with self-affirmation theory, demonstrating that when participants had been provided with an opportunity to focus on personally important values after writing a counter-attitudinal essay, they were less likely to demonstrate attitude change. Steele and Liu (1981) found that the mere expectation of being able to affirm one's self after a dissonant act could also reduce dissonance. Tesser, Crepez, Collins, Cornell, and Beach (2000) also demonstrated that when dissonance is greatest, in a high choice condition, participants write more self-affirming essays about an important value.

Further research using dissonance paradigms has clarified factors that moderate the effectiveness of self-affirmation to overcome dissonance. Blanton, Cooper,

Skurnik, and Aronson, (1997) demonstrated that the relationship between the domain of the self-affirmation and of the self-threat influences its effectiveness at reducing dissonance. That is, self-affirmation in the same domain as a threat, for example affirming one's compassion while advocating funding cuts for students with disabilities, exacerbated dissonance. People have also been shown to prefer self-affirmations that are not contradicted by a self-threat (J. Aronson, Blanton, & Cooper, 1995). For example, when given a choice of self-concepts on which to self-affirm people will choose those that are unrelated to the threat. These findings suggests that affirmation can act both as a source of self-objectivity and also as a standard. If an affirmation is contradicted by a threat in the same domain the affirmation may remind participants of their failings and have negative consequences for their self-conceptions.

Research has also examined whether people will actually engage in self-affirmation in a separate domain following a threat. Stone, Wiegand, Cooper, and Aronson (1997) threatened participants by reminding them of their own or other's excuses for unsafe sexual practices. When participants were personally threatened in this way they were more likely to self-affirm by donating money to a homeless project, than those who were not threatened, providing support for self-affirmation theory. However, when an option to directly reduce dissonance was presented (purchasing condoms) participants were more likely to choose the direct rather than the indirect strategy to overcome the threat. Steele (1988) proposes that people are likely to engage in whatever strategy is most accessible to restore self-integrity, whether that be by directly changing behaviour, or by elaborating defensive cognitions, or affirmation in separate domains.

Self-affirmation has also been applied to persuasive communications. Cohen, Aronson, and Steele (2000) provided participants with counter-attitudinal information that was either for or against the death penalty. In comparison to non-affirmed participants, self-affirmed participants rated the attitude-disconfirming evidence more favorably and demonstrated attitude change towards the counter-attitudinal message. This finding is indicative of self-affirmation reducing biased processing of counter-attitudinal information. In a further study, in which participants were provided with arguments both for and against abortion, Cohen et al. (2000) found that self-affirmation acted to reduce biases in processing of attitude-congruent information,

such that self-affirmed participants were less likely to unconditionally accept information congruent with their prior beliefs.

Self-affirmation has also been shown to influence people's choices of social comparisons. After receiving failure feedback, for example on a test of social accuracy, people tended to choose to compare themselves with others on a dimension that they were good as opposed to bad at, and choose to make comparison with another's weakness opposed to their strengths (Wood, Giodano-Beech, & Ducharme, 1999). Self-affirmation has been shown to reduce this bias in selection of comparisons (Wood et al., 1999). Spencer et al. (2001) also demonstrated that, after a self-threat, self-affirmation could eliminate the tendency to choose an inferior target for comparison, and lead to people choosing a superior target (i.e., one that had performed well on a task; see also Tesser & Cornell, 1991). These findings suggest that, after a self-threat, people are motivated to engage in strategies to restore their self-integrity, for example through making downward social comparison, and this motivation can be reduced through self-affirming a valued aspect of the self. Indeed, Tesser, et al. (2000) demonstrated that when participants were given an opportunity to write about an important value, those who had previously been threatened by writing about being out-performed by a close other, wrote more self-affirming essays than did those who had written about out-performing a close other.

As well as evidence that self-affirmation can influence choice of social comparison information, self-affirmation also appears to influence people's responses to stereotype information. Fein and Spencer (1997) found that non-affirmed participants evaluated an out-group target more negatively than did a control group, and that self-affirmation eliminated this derogation of a stereotyped minority. This finding was argued to demonstrate both the effectiveness of self-affirmation and to suggest prejudice may serve a self-protection function. Harvey and Oswald (2000) provide further support demonstrating that exposing white participants to a civil-rights video, which aimed to increase collective guilt and shame, led to suppression of support for social programmes targeted at black people. Self-affirmed participants, however, were found to increase their support for the black programmes.

Aronson and Damiani (1997) examined whether self-affirmation could reduce black participants' underperformance on evaluative tests, on the basis that test anxiety

and therefore underperformance are associated with stereotype threat. In this study, participants completed either a relevant affirmation (i.e., verbal ability), irrelevant affirmation (i.e., social skills or ethnic identity), or no affirmation prior to a verbal ability test. Results demonstrated that when the affirmation was relevant to the test, underperformance on the task was reduced, indicating that self-affirmation may have the ability to reduce stereotype threat.

Self-affirmation has also been found to have on effect on attributions (Liu & Steele, 1986). Undergoing helplessness training has been shown to be associated with increases in attributional analysis (Pittman & D'Agostino, 1985; Pittman & Pittman, 1980). Attributional analysis can be measured, for example, by asking participants to read an essay and make attributions about why the author may have written the essay. More extreme attributions are argued to reflect more attributional analysis. Liu and Steele (1986) suggest that helplessness training threatens a person's perceptions of being competent and in control (i.e., their self-integrity). While engaging in more attributional analysis helps regain that sense of being efficacious. Liu and Steele (1986) found that affirming a central value eliminated the effects of helplessness training on attributions, thus supporting their claim that helplessness training acts as a threat to self-integrity and self-affirmation can reduce this threat.

Research has also provided evidence that self-affirmation can buffer people against the negative effects of threats to one's sense of self-integrity in the form of job insecurity (Petzall, Parker & Stoeberl, 2000; Wiesenfeld, Brockner, Petzall, Wolf & Bailey, 2001). In addition, Keough, Garcia and Steele (1997) demonstrated the potential benefits of self-affirmation for participants' physical health. Participants who self-affirmed an important value regularly over a period of time, reported being physically healthier than those who thought about things that made them feel good or a friend.

Self-affirmation theory has also been applied to a variety of other research areas, from understanding narcissism (Morf & Rhodewalt, 2001), motivations for matricide (Holcomb, 2000), desire to work in television (Ursell, 2000), motivations for smoking (Denscombe, 2001), to dealing with hypocrisy within organizations (Brown & Jones, 2000). The diversity of topics in which self-affirmation theory has been

tested not only provides a breadth of evidence in support of the theory but also highlights the wide ranging implications.

Self-affirmation and self-esteem

The general literature on self-affirmation has provided evidence supportive of Steele's self-affirmation theory. Providing participants with an opportunity to focus on central and valued aspects of the self has been found to reduce defensive reactions to self-threats. Furthermore, people naturally engage in self-affirmation strategies in separate domains to threat when these are made salient (e.g., Tesser et al., 2000). Further tests of self-affirmation theory have examined its prediction about the effects of dispositional self-esteem. Steele's theory proposes that those with high self-esteem have more resources with which to restore their self-integrity when they experience self-threats. Thus those with high self-esteem should be less likely to engage in rationalisation, for example, in response to a dissonant act. Self-affirmation theory's prediction about the effects of self-esteem, are contrary to those of E. Aronson's (1968) self-consistency theory. E. Aronson predicts that those with high-self esteem will experience greater inconsistency after experiencing a threat to positive aspects of the self, and thus attempt to rationalise the inconsistency to a greater extent than those with low self-esteem. In a test of these two opposing theories Steele et al. (1993) used a standard dissonance procedure and found that, in support of self-affirmation theory, those with low self-esteem engaged in more rationalisation, than those with high self-esteem. This was particularly the case when self-esteem was made salient. Supporting this Holland, Meertens and Van Vugt (2002) also found greater levels of self-justification and psychological discomfort in those with low self-esteem compared to those with high self-esteem, after dissonance was aroused.

Research examining the use of social comparison has demonstrated that when self-esteem resources are made salient, participants with low self-esteem are more likely to engage in downward social comparisons, than those with high self-esteem (Spencer, Fein, & Steele, 1992). Further studies comparing low self-esteem and high self-esteem participants on estimates of performance (Spencer & Steele, 1992; cited in Spencer, Josephs & Steele, 1993), risky decision making (Josephs, Larrick, Steele & Nisbett, 1992), and information seeking behaviour (Steele, Spencer & Josephs, 1992)

provide further support for the assumption that those with low self-esteem hold fewer resources with which to self-affirm, in comparison to those with high self-esteem.

These studies provide evidence consistent with self-affirmation theory, rather than self-consistency theory, suggesting that those with high self-esteem may naturally have greater resources to deal with threat to self-integrity.

Limitations to the effects of self-affirmation

The research presented here provides support for self-affirmation theory. For example self-affirmation has been shown to reduce biased responding to information which is thought to pose a threat to self-integrity, and consistent with Steele's prediction those with high self-esteem rationalise threats to a lesser extent than those with low self-esteem. However, research has also uncovered limitations to the effects of self-affirmation. For example, as already discussed, a variety of other studies have suggested that relevant self-affirmations, those in the same domain as a threat, may act as a standard and are not able to reduce threats to self-integrity (J. Aronson et al., 1995; J. Aronson, Cohen, & Nail, 1999; Blanton et al., 1997). In at least one study the reverse has also been shown to be true. J. Aronson and Damiani (1997) found relevant but not irrelevant self-affirmations were able to reduce stereotype threat.

Galinsky, Stone and Cooper (2000) have also demonstrated that the effects of self-affirmation are eliminated when disconfirmatory evidence is presented. Galinsky et al. provided participants with an opportunity to affirm their central values, and then provided them with feedback that suggested they scored below average on these values. Using a forced-choice paradigm, they found that disconfirming a self-affirmation led to dissonance being reinstated. These findings suggest there are limitations to the effectiveness of affirmations.

A study by Greenberg et al. (1993) has provided another example of why self-affirmation may fail to reduce biased responding to a self-threat. Greenberg et al. applied self-affirmation to Terror Management Theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg, Pyszczynski, 1991). TMT proposes that people's desire to maintain a positive experience of the self is ultimately driven by fears over mortality and vulnerability. Greenberg et al. (1993) explored whether affirming participants by providing them with positive personality assessments would reduce biases in self-judgements of traits associated with negative

consequences. Participants were provided with information that suggested either that emotional or unemotional people die young, while for half the participants their mortality was also made salient. Participants were then asked to rate themselves on how emotional they were. Participants in the non-affirmation conditions, irrespective of whether mortality was made salient, showed a bias in their self-judgements of their own emotionality. For example, those who were told that being emotional led to early death reported themselves to be less emotional. Self-affirmation was able to reduce this bias, but only if mortality was not made salient. This finding may suggest that when a threat to the self is too great, for example participants are presented with multiple threats to self-integrity, self-affirmation is unable to reduce biased processing. Steele (1988) also acknowledges that self-affirmation will only be effective in reducing threats to the self-integrity when the domain being affirmed is as important and central as that threatened. For example, affirming some peripheral aspect of the self, for instance one's skill at table tennis, is unlikely to reduce a threat to a more valued and central self-concept, such as being told you are a bad father.

Self-affirmation appears to reduce defensive responding to self-threats. These findings, however, highlight some of the limitations to the effects of self-affirmation. Affirmations related to a self-threat appear to act as standards rather than a resource to reduce defensive responding, whereas self-affirmation targeting aspects of the self less central or valued as that threatened may also be ineffective.

Alternative accounts for the effects of self-affirmation

Though the aim of this introductory chapter is not to provide a comprehensive review of self-esteem maintenance and self-regulation theories, which are numerous (Tesser, 2000), some alternative accounts of the effects of self-affirmation are worth noting, for example, dissonance theory and Tesser and colleagues' (2000) work on the confluence of self-processes. These accounts have specifically examined whether the effects of self-affirmation are mediated not by self-integrity but by other processes.

Drawing on concepts from dissonance theory (Festinger, 1957), Simon, Greenberg, and Brehm (1995) have argued that self-affirmation does not act to restore self-integrity, but as a trivialisation manipulation. Trivialisation refers to a reduction of the importance of a perceived threat. For instance, when faced with failure feedback on an intelligence test, focusing attention to some other important aspect of the self may

reduce the importance of that failure by putting it into context of other aspects of the self. Simon et al. demonstrated that asking participants to focus on generally important issues, such as world poverty, could reduce attitude change in a dissonance paradigm, just like self-affirmation did. They argue that those who are self-affirmed respond less defensively to self-threats as these threats are perceived as less important to the self.

To test this alternative explanation for self-affirmation findings, Koole et al. (1999) examined whether self-affirmation was associated with trivialisation of failure on an intelligence test. They found no differences between non-affirmed and self-affirmed participants on reports of how important the IQ results were. Koole et al. argue this provides evidence that self-affirmation does not result in trivialisation of threats to the self, and provides support for Steele's self-affirmation theory.

E. Aronson (1992) also suggests that the effects of self-affirmation can more easily be explained using dissonance theory. Self-affirmation may act to make dissonant acts harder to rationalise. For example, in the context of a health message, a self-affirmation task may remind people that they are a good person, and subsequently make it harder for them to rationalise an inconsistent behaviour (e.g., "good people don't put their health at risk"). Thibodeau and Aronson, (1992) have also argued that self-affirmation findings could be accommodated by the original dissonance theory, suggesting that affirming one's values may act to remind participants of aspects of the self that are consistent with their self-concept. Thus self-affirmation manipulations may act not to restore self-integrity, but as a reminder of consistency which reduces the perceptions of inconsistencies, which Festinger argues drives processes such as rationalisation.

Tesser and colleagues (Tesser, 2000; Tesser & Cornell, 1991; Tesser, et al., 2000) have also provided an alternative theory to that of self-affirmation. Tesser interprets evidence that self-affirmation can reduce attitude change in dissonance paradigms, or the tendency to make self-enhancing social comparison as evidence that self-affirmation is one of many self-esteem maintenance mechanisms. Tesser argues that these mechanisms can be substituted for one another as they share a common currency, that of affect. Thus, unlike Steele (1988), who proposes self-affirmation reduces defensive responses by restoring self-integrity, Tesser (2000) argues that changes in affect mediate the effects of self-affirmation. Tesser et al. cite evidence

from the dissonance (Fazio & Cooper, 1983), social comparison (Tesser, Millar, & Moore, 1988) and self-affirmation literature (Koole et al., 1999) to suggest that all these strategies can reduce psychological discomfort and negative affect when a person is confronted with a threat to their self-esteem.

Steele, Spencer and Lynch (1993) state that affect does not mediate the effects of self-affirmation, but rather that changes in self-integrity do. To test this alternative hypothesis Steele et al. (1993) provided participants with a positive mood manipulation prior to a free-choice dissonance task. The results suggested that positive mood did not influence self-justifying attitude change in the same manner as self-affirmation, providing support for Steele (1988).

Contrary to Steele (1988), these examples illustrate that the effects of self-affirmation may not be mediated by changes in self-integrity. Instead the findings may reflect a motive for consistency, or a broader self-esteem maintenance mechanism mediated by affect. Whether the desire for self-integrity does account for the effect of self-affirmation, and the usefulness of these alternative accounts, will be returned to in Chapter 7.

Self-affirmation theory and health messages

This chapter has outlined the effects of self-affirmation on responses to negative or belief-incongruent information. The current thesis focuses on the effects of self-affirmation on the processing of health information. There is evidence that health messages are often processed in ways that appear biased or even defensive (Reed & Aspinwall, 1998) and the study of whether self-affirmation reduces such biased processing has clear practical potential. Indeed, providing evidence that self-affirmation may promote greater message acceptance not only has implications for applied research, but also for models of the effects of fear appeals, as well as self-affirmation theory itself.

A few studies have applied self-affirmation to the study of processing of health information (Boney-McCoy, Gibbons, & Gerrard, 1999; Klein, Blier, & Janze, 2001; Reed & Aspinwall, 1998; Sherman, Nelson, & Steele, 2000), with mixed findings. Based on the assumption that health threats pose a threat to one's self-integrity (Croyle et al., 1997; Giner-Sorolla et al., 1997), Reed and Aspinwall (1998) tested whether self-affirmation was able to reduce biased processing of a health message. Prior to

receiving the health message participants were assigned to either a control task, completing an opinion survey, or to self-affirm by recalling times when they engaged in kind acts. Reed and Aspinwall argue that kindness is an important value to most people and therefore should provide a means of affirming valued self-concepts for most participants. Women who reported low and high caffeine consumption were then presented with a health message outlining evidence both for and against the link between developing fibrocystic breast disease (FBD) and caffeine consumption. To assess biased processing and subsequent message acceptance, Reed and Aspinwall measured belief in the link between FBD and caffeine, ratings of argument strength, intentions to reduce caffeine consumption and, after one-week, participants' behaviour and recall of information. Frequent caffeine drinkers who were self-affirmed were more convinced by the negative health information than those who were non-affirmed. This finding is consistent with self-affirmation reducing biased processing. However, self-affirmed participants also reported a reduction in intentions to cut down on their caffeine intake, and did not differ in their caffeine drinking after one week. Furthermore, non-affirmed participants spent more time reading the information, and recalled more of the message after one week. Clearly, these findings provide mixed evidence for the effectiveness of self-affirmation to reduce biased processing and promote message acceptance.

Sherman et al. (2000) reported two studies showing more promising effects of self-affirmation. In study one, before reading a health message, participants were assigned to either an affirmation or control condition. Self-affirmed participants completed a values scale concerning their most important value, (adapted from Allport, 1960), whereas those who were non-affirmed completed a scale corresponding to their least important value. The health message presented was the same caffeine and FBD risk message used in Liberman and Chaiken (1992). Self-affirmed caffeine drinkers were more likely to accept the health message, than those who were non-affirmed. Self-affirmed participants also reported greater intentions to reduce their caffeine intake, thus suggesting self-affirmation reduced bias processing and promoted message acceptance.

In Study 2, sexually-active men and women were recruited to take part in a study ostensibly evaluating AIDS education materials. Those assigned to the self-

affirmation condition were asked to write a short statement about their most important value, while non-affirmed participants wrote about their least important value. Participants then watched an AIDS education video aimed at increasing perceptions of risk and the need to adopt AIDS-preventive behaviours. Those who were self-affirmed reported greater risk perceptions for HIV than non-affirmed participants. Furthermore, those who were self-affirmed engaged in more precaution-relevant behaviours, taking more leaflets about HIV and purchasing more condoms. These findings suggest that self-affirmation reduced biased processing of a relevant health message.

However, other studies have found less encouraging evidence for the effects of self-affirmation. Klein, Blier, and Janze (2001) conducted a study investigating the impact of self-affirmation upon participants' risk perceptions for heart disease and alcohol poisoning. At Time 1, participants were asked to rate their risk factor standing on these two health risks, and their comparative risk of experiencing the conditions. Two months later (Time 2) they returned and half of them were provided with an opportunity to self affirm by writing an essay about an event that made them feel proud. As a threat manipulation, orthogonal to the affirmation manipulation, half of the participants were provided with challenging comparative risk information regarding their risk of heart disease and alcohol poisoning. Self-affirmed participants who were presented with threatening comparative risk information appeared to make less inductive risk judgments, (i.e., risk judgments not based on their risk factor standing). For example, compared to those who were non-affirmed, self-affirmed participants' risk factor standing for heart disease was less strongly associated with their risk judgments at Time 2. While risk factor standing for alcohol poisoning was no longer associated later risk judgments. Furthermore, for risk perceptions of heart disease, self-affirmed participants' self-esteem emerged as a significant predictor. Thus it appeared that those who were self-affirmed based their risk perceptions not on their risk behaviours but on how they felt about themselves. Klein et al. argue that there are times when self-affirmation appears to lead to less objective assessment of risk, and self-judgments based on self-esteem rather than actual risk.

Boney-McCoy, Gibbons, and Gerrard (1999) tested the effects of self-affirmation by offering participants an opportunity to self-affirm on a personality inventory after being presented with a health threat. Boney-McCoy et al. were

interested in what effect engaging in compensatory self-affirmation (i.e., focusing attention on positive self-conceptions following a threat) had on perceptions of a health risk. Sexually active participants were offered an opportunity to self-affirm on a personality inventory either after being threatened or not. Those in the threatened condition were asked to list behaviours or factors that might lead to them contracting a sexually transmitted disease (STDs). Threatened participants with high self-esteem engaged in greater compensatory self-affirmation by rating themselves more favorably on the personality inventory. However, those who appeared to have self-affirmed the most (i.e., rated themselves most favourably) also reported lower risk judgments for STDs in comparison to high self-esteem participants who engaged in less compensatory self-affirmation. This finding suggests that self-affirming on unrelated personality traits did not offer a resource for self-objectivity, but instead that self-affirmed participants were less likely to accept their personal risk. A possible explanation is that self-affirmation not only reduces the motivation to respond defensively, but also the motivation to accept the message and change one's behaviour. Steele's theory suggests that when encountering a self-threat, self-integrity can be restored both directly, for example by changing a risky health behaviour, or indirectly, by applying defensive cognitions or by affirming one's self in a separate domain. Consequently, self-affirmation in a separate domain could reduce the motivation to apply defensive cognitions, but also to accept the need to change behaviour as a route to restore self-integrity. This interpretation of Steele's theory would suggest that, although self-affirmation may reduce biased processing of a health message, participants may also be less motivated to change their behaviour.

The impact of self-affirmation in the context of health threats has provided mixed findings. Reed and Aspinwall (1998) and Sherman et al. (2000) provide evidence that self-affirmation may reduce the biased processing of health messages, with self-affirmation associated with increased acceptance of the message and greater perceptions of personal risk. However, the evidence for changes in intentions and behavior are mixed, with Sherman et al. finding evidence for changes in both, but Reed and Aspinwall failing to find evidence for such changes in their study. Both Boney-McCoy et al. (1999) and Klein et al. (2001) suggest that self-affirmation can lead to people being more, rather than less, defensive when faced with health threats,

with participants' positive self-views not acting as a resource but as information about the self.

Terminology

Self-affirmation theory suggests that people process negative, personally-relevant health information in a biased manner because it poses a threat to their self-integrity. Subsequently, negative, personally-relevant health messages have been described as "threatening" (Reed & Aspinwall, 1998; Sherman, et al. 2000) and the biased processing of this information as "defensive". The use of terms such as threatening and defensive processing are contentious, as they imply that biased responding to health-risk information is a result of motivated processing. While recognising that this is not necessarily the case, with evidence to suggest that non-motivational factors such as expectations also contribute to biased responding (Renner, 2004), for ease of expression in the current thesis health messages that provide negative and personally-relevant information will be referred to as threatening and, terms such as "defensive processing" will be used to indicate a pattern of responses including attentional avoidance, denial of risk, minimisation of personal implications of threat, and counter-arguing.

Research Questions

The research reviewed in this chapter provides evidence that self-affirmation can reduce defensive reactions to threat in a variety of different domains. However, there still remain questions about self-affirmation as a technique to promote self-objectivity in response to health threats. Past research directly examining the effects of self-affirmation on the processing of health messages (Reed & Aspinwall, 1998; Sherman et al., 2000) and reactions to information that threatens perceptions of health (Boney-McCoy et al., 1999; Klein et al., 2000) have been inconclusive in demonstrating whether self-affirmation has the potential to reduce defence motivation. While some studies have found evidence that affirming valued aspects of one's self can provide a resource to reduce biased processing of health threats, others have found mixed results, or evidence indicative of greater defensiveness after a self-affirmation. There still remain questions about the effectiveness of self-affirmation to reduce

defensive processing of health threats. The present research aimed to investigate this issue.

In Chapter 2 the ability of self-affirmation to promote acceptance of a personally-relevant health message is examined. Chapter 2 extends past research by including measures of both cognitive and affective responses to threat, while testing how durable and specific the effects of self-affirmation are. Chapter 3 describes the development of a self-affirmation technique. The self-affirmation task, which focuses participants' attention on their personal strengths, provides an additional technique to those available with the benefits of being practical to administer, using values expressed in ways that are appropriate and meaningful to contemporary samples, and possessing an equivalent control condition. Using this self-affirmation technique, Chapter 4 examines the effects of self-affirmation on orientation to threat, assessing whether self-affirmation can reduce attentional avoidance of health-risk information. In addition, Chapter 4 also examines depth of processing, by measuring time spent processing information and the accuracy of recall. The study also looks for direct evidence that self-affirmation affects the accessibility of defensive cognitions following threat. Chapter 5 provides a further test of self-affirmation on depth of processing of health-risk information, examining participants' sensitivity to the strength of arguments presented. This study is an Internet-based study and extends the findings of Study 1 by using the same health message but a non-student sample. Finally, in Chapter 6, self-affirmation is applied to an established health message. This study draws on models of processing of fear appeals and tests the effects of self-affirmation on threat and coping appraisals, as well as measures of self-reported affect.

Examining what effects self-affirmation has on the processing of health threat provides the potential to illuminate the underlying mechanisms by which self-affirmation influences reactions to threats to the self in general. Therefore, investigating self-affirmation within the health domain provides an opportunity for research of both theoretical and applied interest.

As shown in Chapter 1, previous studies examining the effects of self-affirmation on the processing of negative and personally-relevant health threats have provided mixed results. Self-affirmation has been found to reduce biased processing of health messages (Reed & Aspinwall, 1998; Sherman et al., 2000), but other evidence suggests that self-affirmation can be associated with less objectivity (i.e., risk judgements based less on risk factor standing and more on self-esteem, Klein et al., 2001), and a reduction in acceptance of personal relevance of threat (Boney-McCoy, et al., 2001). There is clearly a need for more tests of self-affirmation theory. The present study is intended to extend previous research by assessing the effects self-affirmation on general, personal and affective measures of message acceptance and to assess the durability of any effects.

Little is currently known about the durability of the effects of self-affirmation. Sherman et al. (2000) found effects of self-affirmation on intention and behaviour measured contemporaneously, but did not subsequently follow up their participants. In comparison, Reed and Aspinwall (1998), who did include a follow-up after one week, failed to find changes in behaviour. They also, however, failed to find changes in intention immediately after self-affirmation, suggesting behaviour change may not have provided an adequate indicator of durability. Furthermore, Reed and Aspinwall did not include measures of message acceptance at follow-up. Therefore providing no evidence that increases in message acceptance were maintained. Looking more generally at the self-affirmation literature (i.e., that examining non health-related threats), studies have only assessed the effects of self-affirmation immediately after the manipulation. Measuring the durability of the effects of self-affirmation provides a means of assessing both the applied potential of self-affirmation to promote message acceptance, as well as addressing theoretical questions. For example, can a single self-affirmation intervention be effective at promoting sustained changes in belief? Self-affirmation may promote message acceptance in the short-term, but if participants subsequently find it hard to change, denial of the threat may provide an easier route to restoring self-integrity. Thus, a single self-affirmation may not be sufficient to promote sustained changes in behaviour or message acceptance. In addition, the durability of the effects of self-affirmation may be indicative of depth of processing. Durable

changes in beliefs would suggest self-affirmation is associated with thoughtful consideration of the message and systematic processing (Petty & Wegner, 1999). In contrast, if changes in belief are short-lived the self-affirmation may be associated with heuristic information processing. Consequently, in the present study, in addition to measuring participants' response to a threatening message immediately after reading it, participants' responses on key measures of cognition, affect and behavior were obtained one week and again one month after self-affirmation.

The fear appeal literature suggests that receiving a relevant message about a health risk can be associated with negative emotions such as fear. Drive reduction models of persuasion (Hovland, 1953; McGuire, 1968, 1969), as well as the Extended Parallel Process Model (EPPM, Witte, 1992, 1994, 2000) suggests that negative affect can interfere with message acceptance, such that the desire to reduce negative affect can lead to maladaptive responses that reduce the experience of threat without changing beliefs or behaviour. Thus defensive responses to a health threat can be associated with attempts to minimise negative affect. In support of this, Croyle & Sande (1988) demonstrated that minimisation of negative affect could provide a means of defending oneself from the implications of a health threat. Thus if defensive responses are associated with attempts to reduce negative affect, and self-affirmation reduces the motivation to respond defensively, self-affirmed participants should report greater worry and fear associated with a health message. Alternatively, self-affirmation could itself act to reduce negative affect, and thus according to fear reduction models, reduce the motivation to respond defensively. Including measures of negative affect in the present study provides a means of testing whether self-affirmed participants accept a health threat even though they experience negative affect, or whether the effects of self-affirmation are mediated by a reduction in negative affect.

The present study was designed also to extend the way in which the effects of self-affirmation on message acceptance have been measured. In addition to measures used in previous studies, for example items measuring the key components of the theory of planned behaviour (Reed & Aspinwall, 1998), the present study included measures distinguishing general message acceptance (i.e., "I believe there is a threat") from personal message acceptance (i.e., "I believe it could happen to me"). In understanding defensive responding to threats, Lazarus (1983) distinguishes these

processes as denial of fact (i.e., denial of the health threat or illness) from denial of implications (i.e., minimising implications of an illness). For example, it is possible for a smoker to accept that there is a link between smoking cigarettes and disease without accepting that this has implications for their own health (Lee, 1989). Models of defensive processing also suggest that engaging in avoidance of personal inferences and counter-arguing the content of a threat are two distinct levels at which defensive processing can occur (Blumberg, 2000). Indeed, moving from accepting the general claims of a message to accepting the personal relevance of the threat is argued to be a critical step in precaution adoption (Weinstein, 1988).

Current research suggests that self-affirmation can increase general message acceptance, for example increasing belief in a threatening message, ratings of evidence strength and agreement that others should reduce risky behaviours. However, there are conflicting findings regarding the effects of self-affirmation on measures of more personal acceptance, for example whether participants accept the need to change their own behaviour. Reed and Aspinwall (1998) reported no increase in intentions, whereas Sherman et al. reported the opposite. Risk perceptions as a measure of personal acceptance has only been employed once (Sherman, 2000; Study 2). Furthermore, participants' reports of intentions may not provide the most accurate indicator of personal message acceptance. For example, a participant could recognise that their behaviour put their health at risk and consequently they needed to change their behaviour, but other factors may limit their ability to actually change (Ajzen, 1991). Ease of imagination could provide an additional measure of personal measure acceptance. The ease with which a person can imagine an event occurring is argued to provide a measure of how likely a person believes an event will be to occur (Kahneman & Tversky, 1982). Thus by asking participants how easily they can imagine developing, for example, FBD as a result of drinking caffeine, provides a measure of whether they have accepted the health-risk applies to them personally. Therefore, in the present study a measure of the ease with which participants could imagine themselves experiencing a health disorder was included as an additional measure of personal message acceptance.

The present study also aimed to extend the way in which the effects of self-affirmation on risk perceptions has been measured. Sherman et al. (2000) included a

single measure of perceptions of personal risk. In the present study an additional measure of risk perceptions for the average other was also included, to permit tests of the effects of self-affirmation on optimistic bias in risk perceptions. Optimistic bias refers to the tendency for people to underestimate their own risk of experiencing negative events, in comparison to others' risk (Weinstein, 1982, 1989). For example, research has demonstrated that for health risks such as experiencing a heart attack (Weinstein, 1980) or developing diabetes (Weinstein, 1982), people tend to believe they are at less risk than other people. This phenomena has been explained by both cognitive and motivational accounts. For example, egocentrism (i.e., people focusing attention on behaviours they perform to minimise their risk, and neglecting to consider the steps an average other might take), and the use of a representativeness heuristic (i.e., perceiving the self as dissimilar to a typical victim) have been offered as cognitive accounts of unrealistic optimism (Higgins, St Amand & Poole, 1997; Weinstein 1980; Weinstein & Lachendor, 1982). Motivational accounts suggest that optimistic bias may serve a self-esteem protective function. For example, being told you are at risk of a disease, but believing others are at greater risk, may serve to reduce the threat to one's self-esteem (Alicke, Klotz, Breiten, Yurak, & Vredenburg, 1995; Kunda, 1990; Regan, Synder, & Kassin, 1985). Alternatively, the desire to reduce anxiety has also been argued to motivate optimistic biases (Higgins et al., 1997). Optimistic bias has proved highly resilient to attempts to reduce it using information (Weinstein & Klein, 1995). Self-affirmation may provide a means of tackling this bias at a motivational level, such that if self-affirmation boosts perceptions of self-integrity and adequacy the motivation to engage in self-enhancing risk judgments may be reduced. Consequently, the extent to which self-affirmation reduced optimistic bias was also measured.

In the present study, risk perception measures were also extended by including risk perceptions for diseases not targeted by the message. This allowed an additional theoretical question, concerning the specificity of the effects of self-affirmation, to be tested. If self-affirmation acts to specifically overcome defensive processing of the message then only changes in risk perceptions directly targeted by the message should be expected. Alternatively, if self-affirmation affects risk perceptions for a range of health threats not targeted by the message, this may indicate self-affirmation allows

participants to more generally reconsider their personal risk to a range of health threats. Self-affirmation may not specifically affect processing of a threatening message, but be associated with a greater openness to acceptance of self-threats, including perceiving the self to be at higher risk of a range of diseases. To test this possibility, the impact of self-affirming on risk perceptions for diseases not targeted in the message were also assessed.

Finally, measures were also included of participants' recall. Research has demonstrated that defence motivation can influence people's recall of health information, leading to self-serving and less accurate recall of health information (Croyle, Sun & Hart, 1997). In the present study, participants' recall of statements found in a health message was measured to examine whether self-affirmation influenced accuracy of their recall of health information. If self-affirmation reduces defence motivation, and promotes accurate systematic processing, higher risk, self-affirmed participants should display more accurate recall of risk information.

Health message

Two topics, caffeine consumption and HIV, have been the focus of much research on defensive processing of health information, with caffeine consumption in particular proving popular with researchers (e.g., Ditto et al., 1998; Kunda, 1987; Liberman & Chaiken, 1992; Raghunathan & Trope, 2002; Reed & Aspinwall, 1998, Sherman et al., 2000). The present study extended this list of topics by examining the impact of self-affirmation on women's risk perceptions for developing breast cancer as a result of their alcohol consumption. This choice of topic has the benefit of targeting a behaviour prevalent in young people today, with evidence that alcohol consumption is a normative aspect of UK students' lives, with pressures on males and females both to drink and to drink to excess (Norman, Bennett, & Lewis, 1998). Consequently the level of alcohol consumption in young people and young women in particular is of great concern (Donaldson, 2001; Meikle, 2001). Extending the health topics on which the effects of self-affirmation are examined, also has the benefit of helping to provide greater external validity for the effects. That is whether the effects of self-affirmation generalise to the processing of other health-risk information. While the use of breast cancer risk as a health threat answers Reed and Aspinwall (1998) call for tests of self-affirmation using more severe kinds of threatening health information. Clearly, both

extending the health topics examined and varying the severity of the messages presented, could help identify limitations of the effects of self-affirmation and it's potential effectiveness as an applied technique to promote acceptance of health messages. In addition, the present study provides a test of whether the effects of self-affirmation generalise to a non-US sample.

The present study took advantage of research published at the time of designing the study showing that alcohol consumption is associated with breast cancer risk (Collaborative Group On Hormonal Factors In Breast Cancer, 2002). In the present study, young women were provided with a health leaflet detailing the increased risk of developing breast cancer from excessive alcohol consumption. The message explained that drinking a single alcoholic drink a day could increase a women's risk of breast cancer by 6% and that women should not drink above that government recommended guidelines of 14 "units" of alcohol per week for women. (A UK unit is 8 grams of alcohol, which is approximately half a pint of beer, one measure of spirit or a glass of wine.) Consequently, the information was relevant and potentially threatening to young women who consumed alcohol to excess and, for most participants, comprised a novel alcohol-related threat.

Prior to receiving the leaflet, participants were randomly assigned to either self-affirm by writing about an important value or to a control condition, which involved writing about an unimportant value. If self-affirmation reduces the motivation to process information defensively, higher risk participants who have self-affirmed should show greater acceptance of the message, which in turn should be associated with increased risk perceptions, greater intentions to reduce alcohol intake, and increased negative affect. If self-affirmed participants are truly persuaded, greater message acceptance should be maintained over time.

Study 1

Method

Participants

Female undergraduates, mainly studying psychology, were recruited to the study ($N = 82$, age $M = 18.8$, $SD = 1.3$ years) in exchange for course credit or entry into a prize draw. Participants' reports of typical weekly alcohol consumption ranged from 0 to 66 units ($M = 11.97$, $SD = 9.33$). Of the participants, 36 reported drinking

above the government recommended level of 14 units per week (18 self-affirmed; 18 non-affirmed). The experimenter was blind to level of alcohol consumption and affirmation condition.

Materials

Questionnaire 1. Pre-manipulation measures included age, sex, course of study, smoking behaviour, alcohol-related attitudes, and alcohol consumption. Participants responded to the items: "Do you smoke?", *yes / no*, and "if yes, how many cigarettes do you smoke a day on average?". These items were included to help camouflage the aims of the study. Responses to the alcohol consumption questions (e.g., "How much alcohol have you consumed in *the last 7 days*?") were given in terms of *pints of beer/lager/cider, shorts, glasses of wine*, and *bottles*, with illustrative examples (for example a bottle was described as either a mixer [e.g., Barcardi Breezer] or beer [e.g., Budweiser]). (Italics indicate emphasis in the original). Participants' responses were later translated into units of alcohol by the experimenter. Reports of alcohol consumption in the past week and in a typical week were strongly correlated, $r(80) = .72$, $p < .001$, and combined into a mean score for analyses. Participants completed four items measuring their general attitudes towards drinking alcohol, all measured on 7-point scales, "For me drinking alcohol is..." *bad / good, harmful / beneficial, unenjoyable / enjoyable, foolish / wise.* These items were combined into a single item measuring attitude, $\alpha = .76$. Participants also completed three attitude items examining beliefs specifically about the health consequences of drinking alcohol, "I believe drinking alcohol could be linked to serious health consequences such as developing cancer", "My current level of alcohol consumption is good for my health", and "My current level of alcohol consumption is bad for my health", *strongly agree / strongly disagree.* The positively worded item was recoded, and the items were combined into a single measure of participants' attitudes towards the health consequences of drinking alcohol ($\alpha = .72$).

Self-affirmation manipulation. Participants were given an information sheet describing what was meant by a value and listing values they were told other students had described as important to them (Appendix A). The illustrative examples of values were: spirituality/religion, creativity, spontaneity, kindness, conscientiousness, friendliness, compassion, intelligence, hedonism, generosity, and

trustworthiness. In the self-affirmation condition, participants were asked to choose a value from the list or another value that was most important to them and asked to write "about why this principle or standard is important to *you*" and "how you use this value in your everyday life". They were asked to try to recall and write about "specific occasions on which this value determined what you did". In the control group, participants were told to choose the value least important to them and asked to write a short statement about why it "could be important to another student". They were specifically instructed to think only about why this value might be important to another person, and not why it was unimportant to them.

Health message. The leaflet, based on a press release (Cancer Research UK, 2002) and a newspaper article (Bosley, 2002), was designed to resemble closely the size and format commonly encountered for this type of leaflet (Appendix B). It was printed in colour on high quality paper and presented as being a pilot health-promotion leaflet being evaluated by researchers in the department. All statements it contained were true. The leaflet was approximately 750 words in length. The leaflet presented the research as convincing, stating that the research provided "the most accurate estimates ever" of the risk of alcohol, and quoted co-authors of the study as stating that the research shows "there is a definite link between alcohol and breast cancer". The message highlighted the fact that it was important for young women to realise that "drinking too much is dangerous". The leaflet stated that "drinking a single alcoholic drink a day increases a woman's chance of developing breast cancer by around 6%", and closed with the recommendation that people did not exceed the UK government recommended levels of alcohol consumption, reiterated those levels for women and men, gave examples of what amount of beer, spirit and wine comprised a unit, and provided genuine contact numbers of advice and helplines for breast cancer and alcohol abuse. Participants in all conditions saw the leaflet as convincing (Table 2.1).

Table 2.1. *Perceptions of How Convincing Leaflet was by Condition and Risk.*

	Lower risk		Higher risk			
	SA (N = 22)	NA (N = 24)	SA (N = 18)	NA (N = 18)	*F* (1, 81)	*p*
Leaflet convincing	4.41 (.80)	4.79 (1.14)	4.83 (.71)	4.67 (.91)	.28	.60

Note. Higher scores indicate participants perceived the article as more convincing. Standard deviations are in parentheses. SA = self-affirmation; NA = non-affirmed (applies throughout this chapter).

Questionnaire 2. Participants were instructed to work through the post-manipulation questions in order, answering them honestly and accurately. The opening section included the items "Had you heard about the link between alcohol and breast cancer before reading the leaflet?" (*yes/no/uncertain*) and "Before today, how much thought had you given to the possibility that you might get breast cancer from drinking alcohol?", *none at all* (0) to *a great deal* (10).

Then followed the risk items: "How likely do you think YOU will be to experience each of the following health problems at some stage in the future? ... *Breast cancer as a result of your current alcohol consumption, breast cancer as a result of other causes, skin cancer,* and *cardiovascular problems, such as heart disease or a stroke.*" Next were the average student items, "How likely do you think *the average Sheffield University student of your age and sex* will be to experience each of the following health problems at some stage in the future?" (same four health problems as above). Responses were given on an 11-point scale, *impossible* (0) to *extremely likely* (10).

There followed a mix of dependent measures (measured on 7-point scales, anchored at 0 and 6) and filler items. Filler items included: "How easy did you find it to understand the content of the leaflet", (*very easy / very difficult*) and "I feel I could explain the content of the leaflet to another person" (*very easily / with difficulty*). Dependent measures (in sequence) were: "How convincing did you find the content of the leaflet?" (*unconvincing / convincing*), current mood ("What is your current mood?", *negative / positive*), anxiety ("The article made me feel a bit anxious", *not at all / extremely*), fear ("I felt fearful while reading the leaflet", *strongly disagree / strongly agree*), belief ("I believe that drinking alcohol increases a woman's chances of developing breast cancer", *strongly disagree / strongly agree*), persuasiveness of article ("In your view, how persuasive are the arguments that there is a link between alcohol consumption and breast cancer?", *not at all persuasive / very persuasive).* The personal reduction item also included the response option *I don't drink alcohol.*). Participants also responded to items measuring worry ("I feel my level of alcohol consumption is something I ... *don't need to worry about/ do need to worry about*),

and evidence strength ("The evidence linking alcohol consumption and breast cancer is ... *very weak / very strong*).

On the final page was the imagination item, "How easy is it for you to imagine yourself developing breast cancer as a result of your current alcohol consumption", measured on a 6-point scale, *not at all easy* (0), *slightly easy*, *quite easy*, *moderately easy*, *very easy*, *extremely easy* (5). The response option *I don't drink alcohol* was also included. Lastly participants completed the three recall items, indicating whether the following statements were true: "Every time a woman drinks an alcoholic drink on a daily basis she increases her chance of breast cancer by 6%" (correct statement), "For young women the harmful effects of drinking on breast cancer outweigh the protective benefits of alcohol on heart disease" (correct statement), and "Smoking increases a woman's chance of breast cancer" (incorrect statement), *strongly disagree / strongly agree.*

Questionnaire 3. The final questionnaire included items from the Theory of Planned Behavior (TPB, Ajzen, 1991). All items were measured on 7-point scales anchored at 0 and 6. Intentions to reduce alcohol consumption were measured on two items, "I intend to cut down on the amount of alcohol I drink in the next 7 days", *strongly disagree / strongly agree*, and (six questions later) "Do you intend to cut down on the amount of alcohol you drink in the next 7 days?", *definitely do not intend to / definitely intend to.* These items correlated strongly, $r(80) = .86, p < .001$, and were combined into a mean score. Subjective norms were assessed by two items, "Most people who are important to me think I should/should not cut down on the amount of alcohol that I drink in the next 7 days," *think I should not/think I should*, and "Most people who are important to me would approve / disapprove of me cutting down on the amount of alcohol I drink in the next 7 days," *would approve / would disapprove* ($r(80) = .50, p < .001$). Two items measured perceived behavioural control, "How much personal control do you feel you have over whether or not you cut down on the amount of alcohol you drink in the next 7 days?", *no control / complete control*, and "I feel in complete control of whether or not I cut down on the amount of alcohol that I drink in the next 7 days," *strongly disagree / strongly agree* ($r(80) = .82, p < .001$). Attitude towards reducing alcohol consumption was measured using the same semantic differentials as in Questionnaire 1 but in response to the item "For me cutting

down on the amount of alcohol I drink in the next 7 days would be". Participants also completed the same attitude measures relating to the health consequences of drinking alcohol as in Questionnaire 1. Two further items were also included to assess self-efficacy to reduce alcohol consumption, "If I wanted to, I could easily cut down on the amount of alcohol that I drink in the next 7 days," *strongly disagree / strongly agree,* and "For me cutting down on the amount of alcohol that I drink in the next 7 days would be...", *very difficult / very easy* ($r(80) = .57, p < .001$).

At the bottom of this questionnaire was Robins, Hendrin and Trzesniewski's (2001) single item self-esteem scale, "I have high self-esteem", measured on a 5-point scale, 1 = *not very true of me*, 5 = *very true of me*. Robins et al. (2001) report four studies demonstrating test-retest reliability over 4 years for this measure and predictive validity with respect to well-being. A subset of participants also completed the Rosenberg (1965) self-esteem scale as part of a mass testing session at the beginning of the semester. In the present study, the Robins et al. measure correlated significantly with the Rosenberg (1965) scale, $r(56) = .54, p < .001$, both immediately after completing the study and a week later.

One-week follow-up. After one week participants received the first follow-up questionnaire, by email. Included were the items measuring reported alcohol consumption over the previous 7 days (from Questionnaire 1), self and other risk items (all diseases), ease of imagining breast cancer from alcohol, worry, belief in the link, persuasiveness of article, evidence strength, recall statement items (from Questionnaire 2), and the Robins et al. measure of self-esteem.

One-month follow-up. One month later participants received the second follow-up, also by email. Included were the following measures from the one-week follow-up: reported alcohol consumption over the previous 7 days, risk perceptions for breast cancer (self and other), and the worry, belief, and strength of evidence items.

Procedure

Participants were tested individually. Upon arriving at the laboratory they were told that, to make full use of their time, they would be taking part in two separate studies: a student values study, for the experimenter's supervisor, and the evaluation of health information study being conducted as part of the experimenter's research.

Participants were told that the experiment would therefore consist of a variety of disparate tasks relating to these studies.

After completing Questionnaire 1, participants were given information about the student values study. The experimenter explained (once again) that this was a separate study being carried out on behalf of her supervisor. It was emphasised that it was important that the participant understood what was meant by a value, and the experimenter asked them to briefly describe what was meant by the term. The experimenter stressed that it was important that they try to write as much as possible and instructed them to write at least one side. To ensure the experimenter was blind to condition, the student values instruction sheet was taken and placed face down in front of the participant, from a pile previously randomised by someone else. The experimenter explained that the instruction sheet described in more detail what the task would involve. In order to minimise the time between the manipulation and the reading of the threatening message, participants were told to move directly on to reading the health leaflet once they had completed the values task. The health leaflet was in a labelled envelope in front of them. Participants were told that some people were being asked to comment on how easy they found the information to understand, but that they were being asked to think about how the health information was relevant to them and how it made them feel. They were instructed to complete Questionnaire 2, also in front of them in a separate labelled envelope, once they had read the leaflet. The experimenter ensured that they were clear about the instructions provided and the order in which they were expected to complete the tasks, then left the room. The participants' behaviour was monitored from outside the door, and the experimenter re-entered when they were ready to complete Questionnaire 3.

After completing the session, participants were reminded about the one-week follow-up that they would receive via email. The experimenter also asked them whether they would be willing to receive a possible second follow-up after one-month, to which all participants agreed. The emails were described as follow-ups to the "study looking at the communication of health information" that participants had completed, and instructions were provided for participants to return their responses by email.

Manipulation Check

Two independent judges rated the essays (using 7-point scales, anchored at *not at all* [0] and *very* [6]), on the following items: (a) "Setting aside your own opinions and values, how self-affirmed would you estimate the writer of this passage to have been (at the end)?", (b) "To what extent have they stuck to the task asked of them?", and (c) "How important does the value they have selected appear to be to them?". The raters also assessed "How much have they written about the value?", using a 3-point scale, *not a lot* (1) to *a lot* (3). Ratings were significantly correlated (Table 2.2). Mean ratings on each variable were therefore used in analyses.

Results

Manipulation Check

Between-participant ANOVAs with condition (self-affirmed or non-affirmed) as the independent variable were conducted to test whether the self-affirmation manipulation successfully focused participants' attention on important and valued aspects of the self, and the non-affirmation task did not (Table 2.2). Analysis revealed that the judges rated the values chosen by participants in the self-affirmation condition as significantly more important than those in the non-affirmation condition. Judges estimated that those in the self-affirmation condition would have been significantly more self-affirmed after writing after the statement, and that they wrote passages that were more positive about themselves. Participants were not judged to have differed in how well they stuck to the task. However, those in the self-affirmation condition wrote marginally more, $F(1, 81) = 3.8$, $p = .054$. Thus participants in both conditions performed the task that they were set, and those in the self-affirmation condition were judged to have been more self-affirmed afterwards.

Table 2.2. *Judges Ratings of Self-affirmation and Non-affirmation Essays.*

Rating	*r(82)*	SA	NA	*F*(81)	*p*
Value important	.98***	5.79 (0.76)	0.18 (0.76)	1920.12	<.001
How self-affirmed	.96***	5.40 (0.62)	0.44 (1.11)	613.60	<.001
Positive about self	.97***	5.38 (0.67)	0.44 (1.22)	508.56	<.001
How well stuck to task	.79***	5.26 (1.03)	5.26 (1.11)	.00	.99
How much wrote[a]	.74***	2.81 (0.36)	2.58 (0.59)	3.80	.054

Note. *** $p < .001$. [a]Scored 1 to 3.

The risk information was confirmed as being novel for most participants, with only 16 (19.5%) reporting having heard previously of a link between alcohol and breast cancer. These were equally distributed between affirmed ($N = 9$) and non-affirmed conditions ($N = 7$). Consistent with this, participants reported having given little thought before the experiment to the possibility that alcohol could give them breast cancer (self-affirmed, $M = 1.0$, non-affirmed, $M = 1.1$), $F(1, 78) < 1, p = .57$. Post-experimental interviews were conducted with the first 10 participants, none of whom reported suspecting that the studies were linked. When asked to think of ways in which they might be linked, no one mentioned anything resembling the real connection between them.

Randomisation Check

Data in Table 2.3 were analysed using one-way, between-participants ANOVAs, with condition (self-affirmed or non-affirmed) as an independent variable. Analysis was conducted separately for those at higher (>14 units per week) and lower (≤ 14 units) risk. The analysis revealed no significant differences in alcohol consumption: higher, $F(1, 34) < 1, p = .56$; lower, $F(1, 44) = 3.8, p = .07$. Self-affirmed and non-affirmed participants in the higher risk group did not differ in attitudes towards drinking, $F(1, 34) = 1.15$, $p = .29$, although self-affirmed participants in the lower risk group had significantly more positive attitudes than those who were not affirmed, $F(1, 45) = 7.32, p = .010$. There were no significant differences in mood: higher, $F(1, 34) = 1.9, p = .18$; lower, $F(1, 44) < 1, p = .71$. Analysis of a subset of participants ($N = 58$) who had completed the Rosenberg (1965) self-esteem scale in a mass session at the beginning of the semester revealed no significant differences in prior levels of self-esteem in either group: higher, $F(1, 21) < 1, p = .83$; lower, $F(1, 33) < 1, p = .96$. Analysis of participants smoking behaviour revealed no significant differences in the number of participants smoking: higher, $F(1, 35) = 1.10, p = .30$; lower, $F(1, 45) = 1.91, p = .17$.

Table. 2.3. *Mean Responses to Randomisation Check Measures Among Higher and Lower Risk Participants by Self-affirmation Condition*

Measures	Higher risk		Lower risk	
	SA ($N = 18$)	NA ($N = 18$)	SA ($N = 22$)	NA ($N = 24$)
Alcohol consumption[a]	19.15 (5.80)	20.82 (6.43)	8.00 (4.30)	5.72 (3.71)
Attitudes[b]	3.50 (0.46)	3.72 (0.73)	3.53 (0.69)	2.94 (0.80)
Mood[b]	2.94 (1.31)	3.50 (1.10)	3.27 (1.42)	3.13 (1.23)
Rosenberg Self-esteem	22.20 (2.15)	22.71 (3.68)	22.47 (3.83)	22.55 (5.11)
Smoking[c]	1	3	0	2

Note. Higher scores indicate higher levels on each of the measures. [a]Units of alcohol. [b]Scored 0 to 6. [c]Number participants reporting smoking.

Message Acceptance

The present study was primarily intended to test whether self-affirmation encouraged greater message acceptance at higher levels of risk (alcohol consumption), and therefore whether there was a significant interaction of condition and risk. A list of the measures of general and personal message acceptance are presented in Table 2.4.

Table 2.4. *Principal Measures of General and Personal Message Acceptance*

Personal message acceptance	General message acceptance
Breast cancer risk from alcohol	Belief in link
Ease of Imagination	Evidence strength
Negative affect items	Persuasiveness of article
Intention	
Behaviour	

Data were analysed using two-step hierarchical regression analyses. The independent variables were first mean centered in order to minimise any problems of multi-collinearity and to aid the interpretation of the interaction (Aiken & West, 1991). The main effects of condition and alcohol consumption were entered at step 1, and the Condition X Risk interaction at step 2. Where the interaction was significant, simple

slopes analyses were conducted (Aiken & West, 1991) for the dependent variable at three levels of the moderator (alcohol consumption): low (one standard deviation below the mean), moderate (the mean) and high (one standard deviation above the mean)[1]. For each analysis that included repeated measures (i.e., time or target; self or other) ANOVA for mixed designs with between-participants' variables of condition (self-affirmed or non-affirmed) and risk as a two-level independent variable (higher >14 units or lower ≤ 14 units per week) were first conducted to examine whether moderated regressions were carried out on combined ratings or within levels of the repeated measures variable. Where analysis revealed interactions between condition and time or target, the regression analyses were conducted within levels of the repeated measures variable. To aid interpretation of the analyses, descriptive data are reported for higher (>14 units per week) and lower (≤ 14 units) risk participants.

Personal message acceptance

Perceptions of risk targeted by the message. Perceptions of risk of contracting breast cancer from alcohol were analysed using four-way ANOVA for mixed designs, with between-participant variables of condition and risk, and within-participant variables of time (immediately after, 1 week, or 1 month) and target (self or other). The data are in Table 2.5.

Table 2.5. *Mean Responses to Risk Perceptions Measures Among Higher and Lower Risk Participants by Self-affirmation Condition.*

Measure	Time 1		Time 2		Time 3	
	SA	NA	SA	NA	SA	NA
Higher risk	$N = 18$	$N = 18$	$N = 18$	$N = 18$	$N = 15$	$N = 16$
Self risk	4.67 (1.57)	3.28 (1.64)	4.33 (1.33)	3.17 (1.58)	4.53 (1.85)	3.19 (1.87)
Average risk	5.67 (1.78)	4.22 (1.70)	5.17 (1.30)	3.83 (1.98)	5.27 (1.71)	3.50 (1.97)
Lower risk	$N = 22$	$N = 24$	$N = 21$	$N = 22$	$N = 18$	$N = 19$
Self risk	2.82 (1.50)	2.75 (1.87)	3.43 (1.72)	3.46 (2.30)	3.00 (1.57)	3.21 (2.44)

[1] Moderated regressions throughout the thesis were conducted in the same manner (e.g., variables were mean centred, and where interactions were significant simple slopes analyses were conducted at three levels of the moderator).

Average risk	5.05 (1.43)	5.50 (2.09)	5.33 (1.65)	5.05 (2.10)	4.00 (1.85)	4.63 (1.98)

Note. Higher scores indicate higher risk perceptions. Scored 0 to 10. Time 1 = immediately after manipulation; Time 2 = after 1 week; Time 3 = after 1 month (applies throughout this chapter).

The effects of condition were not moderated by time or target, alone or in combination with risk (Table 2.6). The main effect of target was significant, $F(1, 63) = 60.7$, $p < .001$, indicating that regardless of condition, participants reported themselves to be at less risk than the average other (i.e., optimistic bias).

Table 2.6. *Testing whether the Effects of Self-affirmation for Risk Perceptions were Moderated by Target, or Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Target	1	175.68	60.68	<.001
Condition X Target	1	0.22	0.08	.79
Condition X Risk X Target	1	4.03	1.39	.24
Error	63	2.90		
Condition X Time	2	0.34	0.21	.81
Condition X Time X Target	2	0.86	1.85	.17
Condition X Risk X Time	2	0.78	0.32	.73
Error	126	2.29		
Condition X Risk X Time X Target	2	0.27	0.74	.48
Error	126	0.50		

As the effects of condition were not moderated by time or target, the moderated regression analysis used breast cancer risk ratings collapsed over time and target as the dependent variable. Neither condition nor risk emerged as a significant predictor. The predicted Condition X Risk interaction was, however, significant, $\beta = .29$, $p = .021$ (Table 2.7).

Table 2.7. *Moderated Regression Analyses for Participants' Risk Perceptions.*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Breast cancer risk from alcohol								
	1.	Condition (C)	.16	.13				
		Risk (R)	-.04	.04	.03	0.82		
	2.	C X R		.29*	.11	2.45	.08	5.60*

Note. * $p < .05$

Simple slopes analyses revealed self-affirmation did not significantly affect risk perceptions when consumption was low, ß = -.16, $p = .38$, or moderate, ß = .13, $p = .28$, but, as predicted, self-affirmation was associated with higher risk perceptions when consumption was high, ß = .42, $p = .012$ (Figure 2.1).

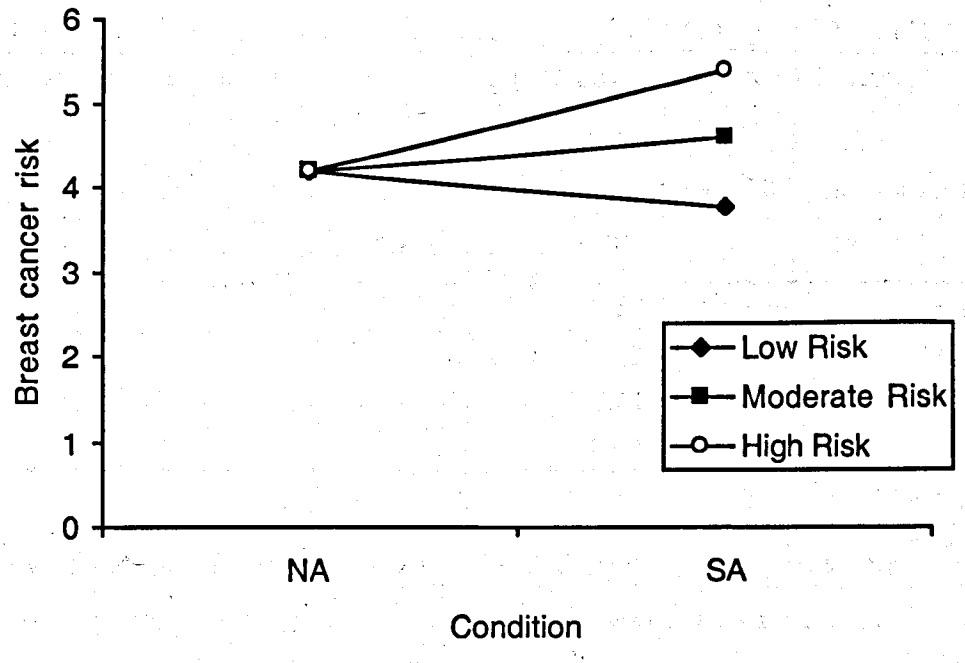

Figure 2.1. Interaction of condition and risk for ratings of breast cancer risk as a result of alcohol consumption: Simple slopes for condition at three levels of risk.

The equivalent analysis was also conducted for the overall ratings of personal risk. This revealed the same effects: self-affirmation did not significantly predict risk perceptions at low, ß = -.11, $p = .53$, or moderate consumption, ß = .12, $p = .33$, but did when consumption was high, ß = .34, $p = .038$. Among higher risk drinkers, risk perceptions for the targeted outcome were higher among those who had self-affirmed. This effect was not moderated by time or target.

Imagination. Ratings of ease of imagination were first analysed using three-way ANOVA for mixed designs, with between-participant variables of condition and risk and within-participant variable of time (immediately after or after 1 week). The

data are in Table 2.8. The effects of condition were not moderated by time, alone or in combination with risk (Table 2.9).

Table 2.8. *Mean Responses to Ease of Imagination Measure Among Higher and Lower Risk Participants by Self-affirmation Condition.*

Measure	Time 1		Time 2	
	SA	NA	SA	NA
Higher risk	1.89 (1.37)	0.76 (0.90)	1.72 (0.90)	0.83 (0.86)
Lower risk	0.95 (1.36)	1.30 (1.64)	0.95 (1.00)	1.10 (1.26)

Note. Higher scores indicate greater ease of imagining developing breast cancer.

Table 2.9. *Testing whether the Effects of Self-affirmation for Ease of Imagination were Moderated by Time, either alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Time	1	0.02	0.29	.86
Condition X Risk X Time	1	0.41	0.74	.39
Error	71	0.55		

As the effects of self-affirmation were not moderated by time, moderated regressions were conducted using the overall ratings of ease of imagining as the dependent variable. Neither main effect was significant at either step. However, the predicted Condition X Risk interaction was significant, ß = .26, p = .028 (Table 2.10).

Table 2.10. *Moderated Regression Analyses for Participants' Ease of Imagination.*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Imagination								
	1.	Condition (C)	.15	.12				
		Risk (R)	.15	.20	.05	1.80		
	2.	C X R		.26*	.11	2.95*	.06	5.05*

Note. * p <.05

Simple slopes analyses revealed that self-affirmation did not significantly affect risk perceptions at low, ß = -.14, p = .41, or moderate consumption, ß = .12,

$p = .28$, but did when consumption was high, ß = .39, $p = .014$ (Figure 2.2). Among higher risk drinkers, self-affirmation predicted an increase in ease of imagining developing breast cancer as a result of alcohol consumption. This effect was not moderated by time.

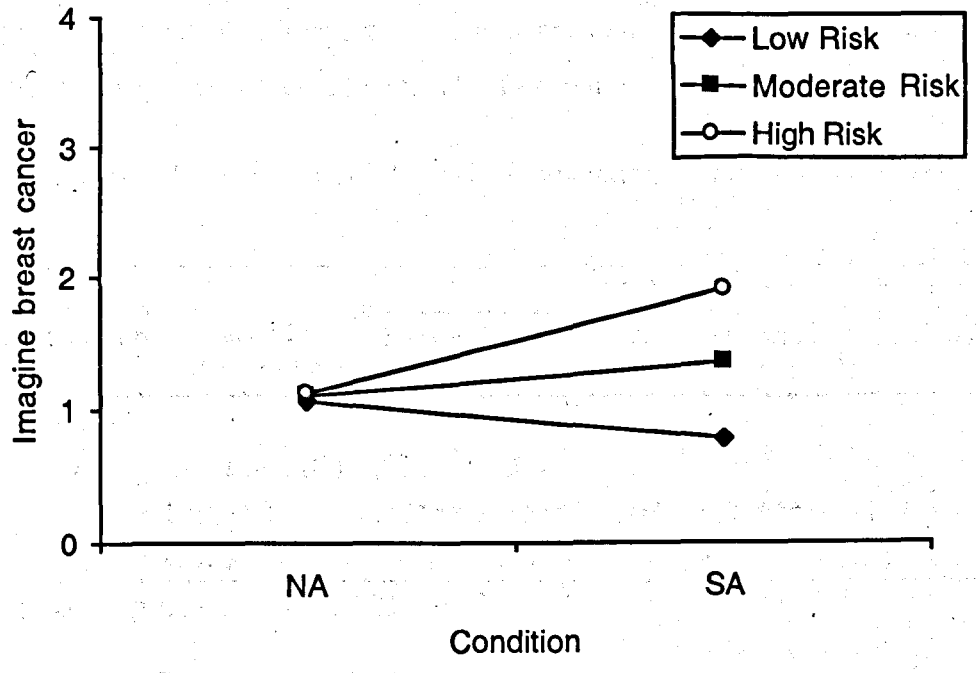

Figure 2.2. Interaction of condition and risk for ratings of imaging developing breast cancer as a result of alcohol consumption: Simple slopes for condition at three levels of risk.

Negative affect. Moderated regression analyses were conducted on the mean ratings of negative affect (anxiety, fear, and worry combined, $\alpha = .68$) as the dependent variable (data in Table 2.11).

Table 2.11. *Mean Responses to Negative Affect Measure Among Higher and Lower Risk Participants by Self-affirmation Condition.*

	Higher risk		Lower risk	
	SA $N = 18$	NA $N = 18$	SA $N = 22$	NA $N = 24$
Negative affect	3.61 (0.77)	2.94 (0.79)	2.32 (1.13)	2.74 (1.20)

Note. Higher scores indicate higher reports of negative affect. Scored 0 to 6.

The main effect of risk was significant at step one, but not at step two (Table 2.12). Condition was not significant at either step. The predicted interaction was, however, significant, ß = .25, p = .016. Tests of simple slopes revealed effects of self-affirmation approaching significance at low, ß = -.25, p = .087, and high, ß = .25, p = .075, but not moderate, ß = .007, p = .98, levels of drinking. The pattern of results is consistent with that presented in Figure 2.3. In comparison to non-affirmation, self-affirmation was associated with reports of more negative affect at high levels of drinking, but less negative affect at low levels of drinking.

Table 2.12. *Moderated Regression Analyses for Participants' Ratings of Negative Affect*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Negative affect								
	1.	Condition (C)	.01	.00				
		Risk (R)	.43***	.38***	.08	9.02***		
	2.	C X R		.25*	.14	8.42***	.06	6.08*

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Intention and behaviour. Data for participants' intentions and drinking behaviour are in Table 2.13.

Table 2.13. *Mean Responses to Measures of Intentions and Behaviour Among Higher and Lower Risk Participants by Self-affirmation Condition*

Measure	Time 1		Time 2		Time 3	
	SA	NA	SA	NA	SA	NA
Higher risk	$N = 18$	$N = 18$	$N = 18$	$N = 18$	$N = 15$	$N = 16$
Intentions	3.44 (1.17)	1.64 (0.98)	--	--	--	--
Alcohol consumption	--	--	19.97 (9.57)	20.61 (8.19)	21.30 (10.14)	21.03 (9.69)
Lower risk	$N = 22$	$N = 24$	$N = 21$	$N = 22$	$N = 18$	$N = 19$
Intentions	1.73 (1.18)	2.10 (1.99)	--	--	--	--
Alcohol consumption	--	--	8.14 (5.19)	6.68 (5.60)	7.42 (6.55)	6.18 (7.04)

Note. Higher scores indicate higher intentions and alcohol consumption. Empty cells mean data not collected.

Moderated regression analyses were conducted on participants' intentions to cut down on alcohol in the next 7 days (Table 2.14). Neither condition nor risk was significant at either step. The predicted interaction, however, was significant, ß = .22, p = .042. Tests of simple slopes revealed that self-affirmation did not significantly affect intentions at low, ß = -.05, p = .73, or moderate consumption, ß = .18, p = .10, but did when consumption was high, ß = .40, p = .01. The pattern of findings was similar to those in Figure 2.1. In comparison with non-affirmed participants, higher risk participants who had been self-affirmed reported stronger intentions to reduce their alcohol consumption.

Table 2.14. *Moderated Regression Analyses for Measure of Intentions*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Intention								
	1.	Condition (C)	.18	.18				
		Risk (R)	.20	.25	.08	3.26*		
	2.	C X R		.22*	.13	3.70*	.05	4.30*

To test whether these changes in intention were reflected in subsequent behaviour, three-way mixed ANOVA with variables of condition, risk and time (1 week or 1 month) were first conducted. The analysis revealed the effects of condition were not moderated by time, alone or in combination with risk (Table 2.14).

Table 2.15. *Testing whether the Effects of Self-affirmation for Behaviour were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Time	1	7.74	0.13	.72
Condition X Risk X Time	1	0.55	0.01	.92
Error	63	57.86		

Moderated regression analyses on combined reports of alcohol consumption after one-week and one-month revealed a significant main effect of risk at both steps. However, neither condition nor the interaction was significant (Table 2.16).

Table 2.16. *Moderated Regression Analyses for Measure of Behaviour*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Behavior								
	1.	Condition (C)	-.02	-.02				
		Risk (R)	.72***	.72***	.52	34.52***		
	2.	C X R		.01	.52	22.67***	.00	0.02

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

General message acceptance

Data for items measuring general acceptance of the health message are in Table 2.17.

Table 2.17. *Mean Responses to Measures of General Message Acceptance Among Higher and Lower Risk Participants by Self-affirmation Condition*

Measure	Time 1		Time 2		Time 3	
	SA	NA	SA	NA	SA	NA
Higher risk	$N = 18$	$N = 18$	$N = 18$	$N = 18$	$N = 15$	$N = 16$
Belief	4.33 (0.59)	4.33 (0.97)	4.56 (0.86)	4.12 (1.41)	4.33 (0.82)	3.00 (1.59)
Evidence strength	3.94 (0.80)	3.39 (1.15)	3.78 (1.11)	3.56 (1.20)	3.73 (1.03)	3.13 (1.63)
Persuasiveness	4.17 (0.70)	3.72 (1.18)	3.50 (1.10)	3.00 (1.28)	--	--
Lower risk	$N = 22$	$N = 24$	$N = 21$	$N = 22$	$N = 18$	$N = 19$
Belief in link	3.91 (1.11)	4.13 (1.42)	3.95 (1.47)	3.76 (1.92)	3.18 (1.67)	3.84 (1.46)
Evidence strength	3.18 (1.33)	3.50 (1.38)	3.30 (1.53)	3.10 (1.67)	3.00 (1.68)	3.95 (1.84)
Persuasiveness	3.41 (1.22)	3.79 (1.38)	2.90 (1.09)	3.25 (1.54)	--	--

Note. Higher scores indicate higher levels on each of the measures. Empty cells mean data not collected.

Belief in the link. Ratings of belief that alcohol causes breast cancer were first analysed using three-way ANOVA for mixed designs, with between-participant variables of condition and risk and within-participant variable of time (immediately, 1 week, or 1 month). The results of the analysis are in Table 2.18.

Table 2.18. *Testing whether the Effects of Self-affirmation for Belief in Link were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Time	2	1.52	2.27	.11
Condition X Risk X Time	2	2.24	3.36	.04
Error	120	0.67		

The three-way interaction emerged as significant. Consequently, moderated regression analyses were conducted on the responses separately at each time point (Table 2.19). The results of these analyses revealed no significant effects of risk or condition alone or in combination. Regardless of drinking behaviour, self-affirmed participants did not report any differences in their belief in the link between breast cancer and alcohol.

Table 2.19. *Moderated Regression Analyses for Belief in Link*

			Beta					
Dependent Variable	Step	Variable Entered	Step 1	Step 2	R^2	Model F	ΔR^2	ΔF
Belief: immediately after								
	1.	Condition (C)	-.06	-.06				
		Risk (R)	.11	.12	.01	0.56		
	2.	C X R		.07	.02	0.51	.01	0.40
Belief: 1 week								
	1.	Condition (C)	.10	.10				
		Risk (R)	.11	.11	.02	0.88		
	2.	C X R		.01	.02	0.58	.00	.002
Belief: 1 month								
	1.	Condition (C)	.09	.08				
		Risk (R)	.05	.09	.01	0.33		

2.	C X R		.15	.03	0.70	.02	1.44

Evidence strength. Data were analysed as for belief ratings. The effects of condition were not moderated by time, alone or in combination with risk (Table 2.20).

Table 2.20. *Testing whether the Effects of Self-affirmation for Ratings of Evidence Strength were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Time	1	0.02	0.03	.87
Condition X Risk X Time	1	1.39	1.72	.19
Error	73	0.81		

Moderated regression analyses were therefore conducted on the ratings of evidence strength collapsed over time. These revealed no significant effects at either step, indicating that participants' ratings of the strength of evidence supporting the link were not significantly influenced by self-affirmation or risk, alone or in combination (Table 2.21).

Table 2.21. *Moderated Regression Analyses for Measures of Evidence Strength*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Evidence strength								
	1.	Condition (C)	.03	.02				
		Risk (R)	.004	.02	.001	0.02		
	2.	C X R		.06	.004	0.08	.003	0.21

Leaflet Persuasiveness. Ratings of how persuasive the leaflet was in general were first analysed using three-way ANOVA for mixed designs, with between-participant variables of condition and risk and within-participant variable of time (immediately, 1 week). The effects of condition were not moderated by time, alone or in combination with risk (Table 2.22).

Table 2.22. *Testing whether the Effects of Self-affirmation for Leaflet Persuasiveness were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Time	1	0.01	0.02	.89
Condition X Risk X Time	1	0.03	0.01	.95
Error	75	0.68		

Moderated regression analyses were therefore conducted on the ratings of general persuasion collapsed over time. These revealed no significant effects at either step, indicating that participants' ratings of how persuasive the arguments were linking alcohol and breast cancer were not significantly influenced by self-affirmation or risk, alone or in combination (Table 2.23).

Table 2.23. *Moderated Regression Analyses for Measures Leaflet Persuasiveness*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
General persuasiveness								
	1.	Condition (C)	.01	.01				
		Risk (R)	.06	.08	.003	0.13		
	2.	C X R		.14	.021	0.55	.018	1.39

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Other outcome measures

Theory of planned behaviour items. Data for mean response to TPB measures are in Table 2.24.

Table 2.24. *Mean Responses to Theory of Planned Behaviour Measures (Time 1 only) Among Higher and Lower Risk Participants by Self-affirmation Condition*

Measure	Higher Risk		Lower Risk	
	SA $N = 18$	NA $N = 18$	SA $N = 22$	NA $N = 24$
PBC	4.53 (1.44)	4.89 (0.98)	5.43 (0.89)	5.42 (0.89)
Subjective norms	4.00 (1.33)	3.53 (1.09)	3.09 (0.91)	2.88 (1.26)
Attitudes (costs)	4.41 (0.59)	4.13 (0.94)	3.12 (1.27)	3.15 (1.27)
Attitudes (cutting down)	4.24 (0.93)	3.89 (0.71)	3.74 (0.84)	3.90 (1.02)
Self-efficacy	4.19 (1.36)	3.89 (1.29)	4.86 (1.07)	5.15 (1.21)

Note. Higher scores indicate higher levels on each of the measures. Scored 0 to 6.

Moderated regression analyses were conducted on participants' reports of perceived behavioural control (PBC). The main effect of risk was significant, ß = -.46, $p < .001$, with higher levels of alcohol consumption being associated with slightly lower perceptions of PBC. However, condition neither alone or in combination with risk was significant (Table 2.25).

Table 2.25. *Moderated Regression Analyses for Measures from Theory of Planned Behaviour*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
PBC								
	1.	Condition (C)	-.05	-.05				
		Risk (R)	-.46***	-.48***	.22	10.97***		
	2.	C X R		-.07	.22	7.44***	.00	.53
Subjective norms								
	1.	Condition (C)	.12	.12				
		Risk (R)	.27*	.28*	.09	3.89*		
	2.	C X R		.08	.10	2.76*	.01	.55
Attitudes towards reducing alcohol								
	1.	Condition (C)	.03	.03				
		Risk (R)	.12	.15	.02	0.61		
	2.	C X R		.17	.04	1.19	.03	2.33
Self-efficacy								
	1.	Condition (C)	.01	.01				
		Risk (R)	-.46***	-.43***	.21	10.78***		
	2.	C X R		.19	.25	8.58***	.03	3.48

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Moderated regression analyses were conducted on the ratings of subjective norms. These revealed no significant effects at either step, indicating that participants' perception of subjective norms were not significantly influenced by self-affirmation or risk, alone or in combination.

Moderated regressions of participants' attitude towards reducing their alcohol consumption revealed no significant effects involving condition, risk, either alone or in

combination (Table 2.25). This indicates that self-affirmation did not influence participants' attitudes towards reducing their alcohol consumption.

To test for changes in participants' attitudes towards the health consequences of drinking alcohol before and after reading the leaflet, a three-way ANOVA for mixed designs, with between-participant variables of condition and risk, and within-participant variables of time (immediately before leaflet, immediately after) was conducted. Analysis revealed no significant effects of condition, either alone or in combination with risk. There was a main effect of time, $F(1, 78) = 12.25, p = .001$, with participants regardless of condition reporting alcohol consumption to be associated with greater costs after reading the leaflet. There was also a main effect of risk, $F(1, 78) = 21.60, p < .001$, such that those drinking higher levels of alcohol reported alcohol to be associated with more costs (Table 2.26).

Table 2.26. *Testing whether the Effects of Self-affirmation on Attitudes about the Health Consequences Associated with Alcohol were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition	1	1.52	0.73	.40
Risk	1	45.59	21.60	< .001
Condition X Risk	1	1.53	1.53	.40
Error	78	2.11		
Time	1	5.15	12.25	.001
Condition X Time	1	0.20	0.48	.49
Risk X Time	1	0.19	0.45	.50
Condition X Risk X Time	1	0.06	0.15	.70
Error	78	0.42		

Moderated regressions for participants' reports of self-efficacy to reduce their alcohol consumption revealed a main effect of risk, ß = -.46, $p < .001$, with participants drinking higher levels of alcohol reporting lower perceptions of self-efficacy. Condition was not significant at either step. However, the interaction did approach significance, ß = .19, $p = .066$. Tests of simple slopes revealed that the effects of self-affirmation did not reach significance at low, moderate or high level of consumption.

Recall of information. Participants' recall of facts presented in the leaflet were first analysed using three-way ANOVA for mixed designs, with between-participant variables of condition and risk and within-participant variables of time (immediately after, 1 week). Data are in Table 2.27.

Table 2.27. *Mean Responses to Recall Measures Among Higher and Lower Risk Participants by Self-affirmation Condition*

	Time 1		Time 2	
Measure	SA	NA	SA	NA
Higher risk	$N = 18$	$N = 18$	$N = 18$	$N = 18$
Recall (central facts)	3.17 (1.65)	3.74 (1.50)	3.64 (1.36)	3.29 (1.61)
Recall (non-central facts)	2.00 (1.88)	1.24 (1.60)	3.56 (1.76)	2.24 (2.14)
Lower risk	$N = 22$	$N = 24$	$N = 21$	$N = 22$
Recall (central facts)	3.23 (1.26)	3.35 (1.58)	3.43 (0.89)	3.48 (1.94)
Recall (non-central facts)	2.36 (1.76)	2.52 (1.97)	3.05 (1.57)	2.95 (1.99)

The effects of condition were not moderated by time, alone or in combination with risk for any of the recall items (Table 2.28).

Table 2.28. *Testing whether the Effects of Self-affirmation for Recall were Moderated by Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Recall of central facts				
Condition X Time	1	1.81	0.97	.33
Condition X Risk X Time	1	2.23	1.82	.18
Error	71	1.22		
Recall of non-central fact				
Condition X Time	1	2.65	1.62	.21
Condition X Risk X Time	1	0.64	0.39	.54
Error	69	1.64		

Moderated regression analyses were therefore conducted on the recall items collapsed over time. Analysis for the facts central to the message revealed no significant effects at either step, indicating that participants' recall was not

significantly influenced by self-affirmation or risk, alone or in combination. However, for participants' recall of the peripheral fact, suggesting smoking could cause breast cancer, the interaction of Condition X Risk approached significance, ß = .22, p = .061 (Table 2.29).

Table 2.29. *Moderated Regression Analyses for Measures of Recall*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Recall (central facts)								
	1.	Condition (C)	-.05	-.05				
		Risk (R)	-.07	-.07	.01	0.28		
	2.	C X R		-.01	.01	0.19	.00	0.01
Recall (non -central fact)								
	1.	Condition (C)	.12	.11				
		Risk	-.06	-.03	.02	0.66		
	2.	C X R		.22	.07	1.66	.05	3.61

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Simple slopes analyses revealed self-affirmation did not significantly affect recall when consumption was low, ß =-.12, p = .49, or moderate, ß =.11, p = .36. However, self-affirmation was associated with greater levels of incorrect recall when consumption was high, ß = .33, p = .041 (Figure 2.3).

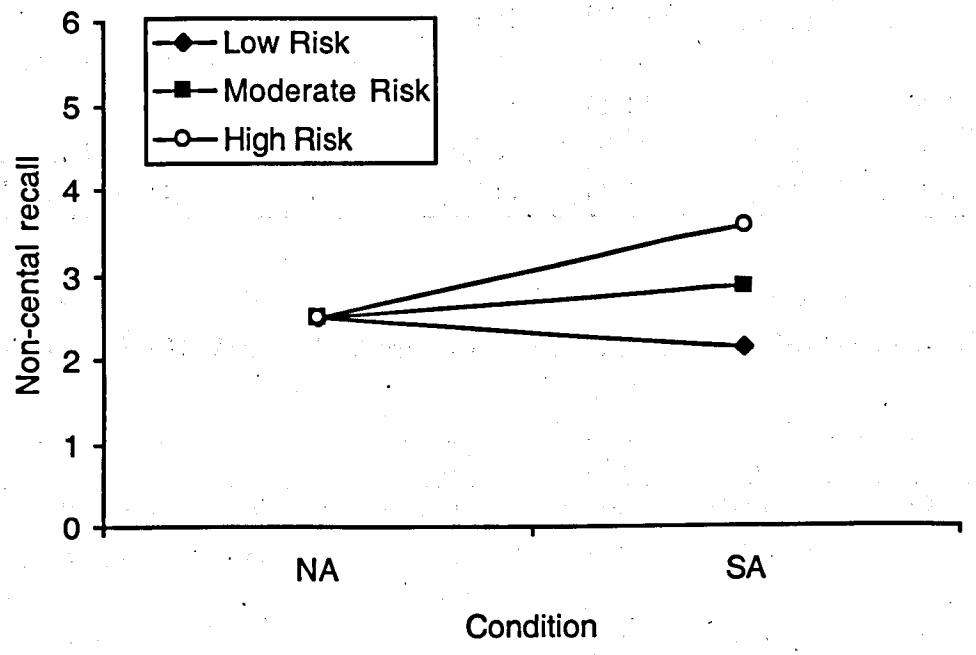

Figure 2.3. Recall of facts peripheral to the message as a function of condition and risk: Simple slopes at three levels of risk.

Risk for Diseases Not Targeted by the Message. Mean ratings of self and other risk for these diseases were combined and analysed initially using four-way ANOVA for mixed designs, with between-participant variables of condition and risk and within-participant variables of time (immediately after, 1 week, 1 month) and target. The data for this analysis are presented in Table 2.30.

The effects of condition were not moderated by time or target, alone or in combination with risk. (Table 2.31). There was a significant main effect of target, $F(1, 62) = 7.6$, $p = .008$, indicating the presence of optimistic bias regardless of condition.

Table 2.30. *Mean Responses to Risk Perception Measures, not Targeted by Message, Among Higher and Lower Risk Participants by Self-affirmation Condition*

Measure	Time 1		Time 2		Time 3	
	SA	NA	SA	NA	SA	NA
Higher risk	$N = 18$	$N = 18$	$N = 18$	$N = 18$	$N = 15$	$N = 16$
Self risk	4.89	4.26	4.69	4.53	5.27	4.63
other diseases	(1.30)	(1.80)	(1.34)	(1.51)	(2.19)	(1.86)

Average risk other diseases	5.33 (1.34)	4.65 (1.65)	5.20 (1.03)	4.54 (1.54)	5.40 (1.80)	4.63 (1.63)
Lower risk	$N = 22$	$N = 24$	$N = 21$	$N = 22$	$N = 18$	$N = 19$
Self risk other diseases	4.30 (1.52)	4.94 (1.74)	4.57 (1.58)	5.29 (1.48)	4.56 (1.85)	5.58 (1.64)
Average risk other diseases	4.89 (1.37)	5.50 (1.74)	5.19 (1.31)	5.38 (1.37)	4.72 (1.32)	5.53 (1.43)

Table 2.31. *Testing whether the Effects of Self-affirmation for Risk Perceptions for Other Diseases were Moderated by Target, or Time, either Alone or in Conjunction with Risk.*

Source	*df*	*MS*	*F*	*p*
Condition X Target	1	1.00	0.75	.39
Condition X Risk X Target	1	0.09	0.07	.79
Error	62	1.33		
Condition X Time	2	0.22	0.13	.88
Condition X Time X Target	2	0.38	0.99	.38
Condition X Risk X Time	2	0.40	0.24	.79
Error	124	1.66		
Condition X Risk X Time X Target	2	0.01	0.00	.96
Error	124	0.38		

The overall risk ratings ($\alpha = .88$) were averaged and combined into a single item for analysis. Moderated regression revealed a significant main effect of risk in the final model but not of condition at either step. However, the interaction was significant, ß = .27, $p = .033$ (Table 2.32).

Table 2.32. *Moderated Regression Analyses for Participants' Risk Perceptions for Disease Not Targeted by the Message*

Dependent Variable	Step	Variable Entered	Beta Step 1	Beta Step 2	R^2	Model F	ΔR^2	ΔF
Risk of other diseases								
	1.	Condition (C)	-.10	-.13				
		Risk (R)	-.21	-.14	.06	1.98		
	2.	C X R		.27*	.13	2.99*	.07	4.77*

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Tests of simple slopes revealed no significant effects of condition at high, ß = .14, p = .40, or moderate levels of drinking, ß = -.13, p = .30, but a significant reduction in risk perceptions at low levels of drinking, ß = -.39, p = .031 (Figure 2.4).

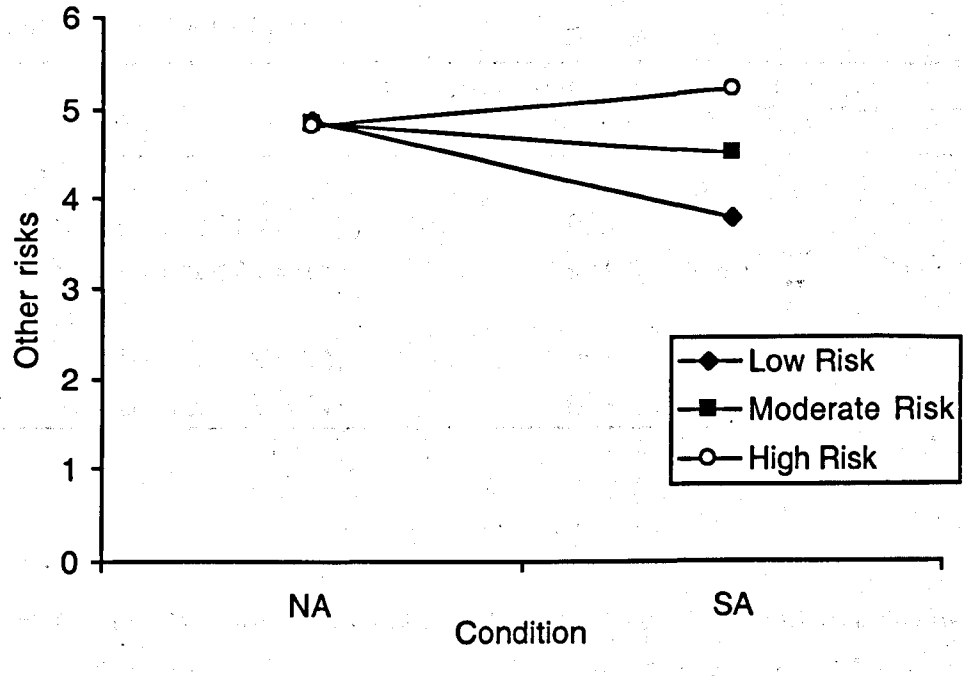

Figure 2.4. Interaction of condition and risk for ratings of risk of disease not targeted by message: Simple slopes for condition at three levels of risk.

Predicting Intentions to change

To test whether differences in risk perception mediated the impact of self-affirmation on intentions in those drinking at a higher level, mediation analyses following Baron and Kenny (1986) were performed. Condition predicted the potential mediator, risk perceptions for breast cancer from alcohol, R^2 = .18, ß = .42, $t(34) = 2.7$, p = .01, and also intentions, R^2 = .42, ß = .65, $t(34) = 5.0$, $p < .001$. However, when intentions were regressed simultaneously on risk perceptions and condition, risk perceptions were not significant, ß = -.11, $t(33) = -.73$, p = .47, indicating that risk perception did not mediate the effect of self-affirmation on intentions.

Risk Perception, Self-esteem and Risk Factor Standing

In comparison to Klein et al. (2001), analysis of the present data provided no evidence that for higher risk self-affirmed participants risk factor standing (units of

alcohol calculated from reported alcohol consumption) was less well associated with self-risk judgment for breast cancer (Table 2.33). Nor were self-affirmed participants' risk perception associated with their self-esteem.

Table 2.33. *Strength of Association Between Self-esteem, Risk Factor Standing and Risk Perceptions for Breast Cancer.*

	Risk factor standing		Self-esteem	
	r	*p*	*r*	*p*
Higher risk				
Self-affirmed ($N = 18$)	.42	.055	-.07	.70
Non-affirmed ($N = 18$)	-.01	.971	-.07	.78
Lower risk				
Self-affirmed ($N = 22$)	.68	.001	.07	.77
Non-affirmed ($N = 24$)	.59	.003	-.22	.39

Self-esteem as a moderator

Moderated regressions were conducted to test whether self-esteem moderated the effects of self-affirmation on participants' acceptance of the message. The single Robins et al. (2001) self-esteem item taken at the first session and a week later were highly correlated, $r(75) = .90$, $p < .001$, and combined into a single item. Self-esteem was not found to moderate the effects of self-affirmation for participants' risk perceptions, ease of imagination, belief in the message, ratings of evidence strength, leaflet persuasiveness, negative affect, or behaviour (Table 2.34). The interaction of Self-esteem X Condition for participants' intentions to reduce their alcohol consumption did however approach significance, ß = .22, $p = .058$. Simple slopes analysis revealed that self-affirmation had little effect at moderate, ß = .14, $p = .22$, and low self-esteem, ß = -.17, $p = .32$. However, at high self-esteem, self-affirmation increased intentions to reduce alcohol consumption, regardless of risk, ß = .41, $p = .010$ (Figure 2.5).

Table 2.34. *Moderated Regression for Self-esteem for Outcome Measures*

	Condition X Self-esteem	Condition X Risk X Self-esteem

	ß	*p*	ß	*p*
Breast cancer risk from alcohol	-.04	.83	-.01	.78
Ease imagination	.19	.39	.01	.67
Negative affect	-.06	.67	-.01	.85
Intentions	.66	.06	-.01	.84
Behaviour	-.68	.72	.10	.71
Belief in link	-.23	.15	-.02	.63
Evidence strength	.03	.86	.01	.83
Persuasive	.31	.23	-.01	.75
PBC	.13	.59	.06	.08
SN	.14	.60	.03	.94
Attitude	.22	.29	.03	.36
Self-efficacy	.24	.40	.05	.23

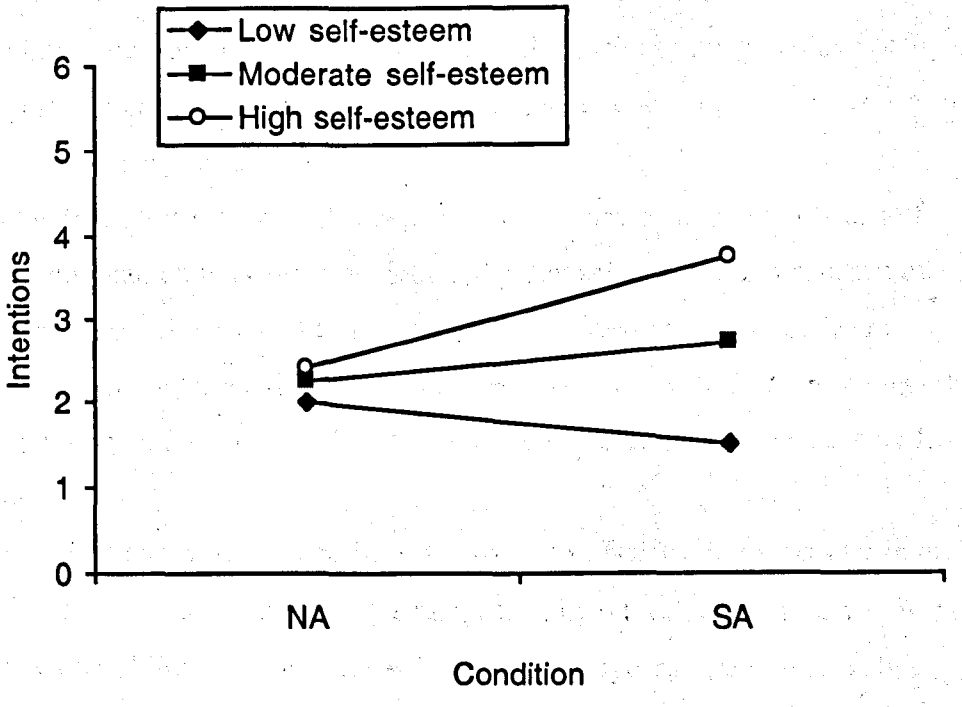

Figure 2.5. Interaction of condition and self-esteem on intentions to reduce alcohol consumption: Simple slopes for condition at three levels of self-esteem

Eighteen-month Follow-up

The current study suggests that self-affirmation can lead to durable changes in participants' acceptance of risk. Eighteen months after the original study, participants

were sent a further follow-up email to assess whether these changes had been maintained over a longer period of time. Unfortunately, only 29 (35% of original sample) responded to the final follow-up, of whom only nine had previously reported drinking above the government recommended level (self-affirmed: 5; non-affirmed: 4). This sample was too small to analyse further owing to loss of statistical power.

Discussion

The findings strongly support the hypothesis that self-affirmation can reduce defensive processing of a threatening message. On a number of key variables, women at greater risk of contracting breast cancer from their alcohol consumption showed evidence of less biased processing and greater personal acceptance of the message contained in the leaflet if they had self-affirmed. Thus, compared to women at higher risk who had not affirmed, self-affirmed women had higher risk perceptions for developing breast cancer from their drinking, found it easier to imagine developing the disease, reported greater intention to reduce their alcohol consumption, and reported higher levels of negative affect.

On the measures of personal acceptance of the message, the effects of self-affirmation were maintained over time, indicating that self-affirmation resulted in changes that were durable as well as consequential. Moreover, the effects were specific to the outcome targeted. Thus, there were no effects of self-affirming on other diseases, including an outcome as close to the targeted outcome as breast cancer from other causes.

That the effects were so specific suggests that self-affirming works by reducing biased responses to threatening messages rather than by a mechanism that heightens the sense of vulnerability more generally. That the message was perceived as being equally persuasive by both the self-affirmed and non-affirmed higher risk groups, who did not differ in their belief that there was a link between alcohol and breast cancer or ratings of the leaflet strength or persuasiveness, suggests that self-affirming specifically reduced denial of personal inferences of the message, rather than biased evaluation of strength or validity of the message. This appeared to be the case at least when, as in the present study, the arguments are strong.

Self-affirmation may have the potential to reduce defence motivation at other levels of processing. For example, if a health message allows participants to more easily counter-argue the contents, non-affirmed participants may be more likely to denigrate the message and the effects of self-affirmation may be seen on measures of general persuasion. Alternatively, if participants are offered an opportunity not to attend to the message, self-affirmation may reduce attentional avoidance. Study 4 tests this latter prediction.

The findings of increases in personal risk and intention among those at higher risk who had been self-affirmed are consistent with those of Sherman et al. (2000). However, self-affirmed participants also increased their perceptions of average risk, thus maintaining an optimistic bias in their risk judgments. This finding highlights a possible limitation to the effects of self-affirmation. One account of optimistic bias is that it results from a desire to maintain positive evaluations of the self (Regan et al., 1995). When faced with a health threat, making positive comparisons with an average other may help to maintain a sense of invulnerability, control (Higgins et al., 1997) and positive self-evaluation (Regan et al., 1995). The fact that self-affirmation was unable to reduce this bias could suggest a number of things. For example, from a motivational perspective, self-affirmation may not have adequately restored positive self-conceptions needed to reduce the motivation to make self-enhancing comparative risk judgments. The fact that self-affirmation reduced bias responding on other measures suggests that the manipulation was successful. Why then was optimistic bias so resilient? Perhaps the resource of self-affirmation can be depleted, and though self-affirmation increased participants' acceptance of personal risk, the effects were not powerful enough to allow them to also recognise their increased comparative risk. Alternatively, the finding could reflect the fact that optimistic bias results from non-motivational causes. Optimistic bias has been argued to result from cognitive factors, such as the use of a representativeness heuristic or egocentrism (Higgins et al., 1997). Perhaps self-affirmation was unable to influence these cognitive processes. Studies 3 and 5 provide further tests of the effects of self-affirmation on optimistic bias.

Self-affirmation did not appear to reduce negative affect that can interfere with message acceptance (Witte, 1992), but rather was associated with reports of greater negative affect. This finding is consistent with self-affirmation providing participants

with a resource to face up to the negative affective consequences of a health message, without negative affect interfering with message acceptance. The finding could suggest that while non-affirmed participants attempted to minimise the affective consequences of the message self-affirmed participants did not. Alternatively, self-affirmed participants may have reported higher levels of negative affect as a result of perceiving the health-risk as more relevant. In either case, the effects of self-affirmation were not mediated by a reduction in negative affect associated with the message.

In the present study, self-affirmed participants reported increased intentions to reduce their alcohol consumption. This is a promising finding for self-affirmation as an applied technique, such that participants not only recognised their increased health-risk but intended to do something about it. This increase in intentions to reduce alcohol consumption was however not translated into changes in subsequent drinking behaviour. Perhaps this finding is not that surprising, for though self-affirmation may reduce biased processing of health messages and help participants to form intentions to change, whether this intention is transformed into behaviour is likely to depend on factors other than message acceptance. Factors such as strong social norms among students to drink, and the impact of peer pressure and habit, may have hindered participants making changes to their drinking behaviour. That said, the fact that self-affirmed women who were at higher risk reported maintained changes in their risk perceptions and reports of ease of imagination suggests that even though they did not reduce their alcohol consumption they did not subsequently defensively reappraise the risk to fit their maintained drinking behaviour. Thus though self-affirmation was not associated with immediate behaviour change, the effects on personal message acceptance were durable, and may have eventually been transformed into a reduction in drinking. Unfortunately, in order to maximise the number of participants responding to the follow-up, the number of variables included at one week and one month were limited. Thus it is not possible to say whether participants also maintained their intentions to reduce alcohol consumption as these were omitted from the follow-up questionnaires.

Contrary to Reed and Aspinwall (1998), the present study found no evidence that self-affirmation increased participants' PBC. Nor were there changes on the measures of subjective norms or attitudes, the variables along with PBC, seen as

precursors in the formation of intentions in the Theory of Planned Behaviour. There was also no evidence that the impact of self-affirmation on intentions was mediated by increases in self-efficacy or risk perceptions. The findings of the current study were not able to establish what factors might mediate the impact of self-affirmation on intentions to change.

For the most part, trait self-esteem did not moderate the effects of self-affirmation. Regardless of trait self-esteem, self-affirmation promoted higher risk perceptions, greater negative affect, and ease of imagination. Self-esteem did however moderate the effects of self-affirmation on intentions to change. When self-esteem was high, self-affirmed participants reported greater intentions to change their alcohol consumption, irrespective of their risk. This finding could reflect the fact that self-affirmation was most effective at increasing personal message acceptance in those who reported high self-esteem. However, this appears unlikely, as self-esteem did not moderate the effects of self-affirmation on the other measures of personal acceptance. Instead, those with high self-esteem may have felt more capable of changing their drinking behaviour, regardless of message acceptance. This is supported by the fact that self-esteem moderated self-affirmation regardless of risk. Overall, the findings suggest that self-affirmation was as effective at increasing acceptance of a health message for those with low and high self-esteem.

The results of the present study indicate that self-affirmed and non-affirmed women at higher risk of breast cancer as a result of their drinking did not differ in their recall of information central to the leaflet's claims about alcohol and breast cancer. However, on the item measuring recall of information peripheral to the message, regarding the risks of smoking cigarettes, self-affirmed participants incorrectly agreed more that smoking increased the risk of breast cancer. The article itself described past research suggesting there was a link, but that new research suggested that smoking did not increase the risk of breast cancer. The fact that self-affirmed participants were less accurate in their recall could be accounted for by a number of different explanations. For example, self-affirmed participants may have evaluated the information more openly, and interpreted the conflicting past evidence to suggest smoking may be linked to breast cancer, even though this was not supported by the new research. Alternatively, non-affirmed and self-affirmed participants may have differed in the

beliefs about the link between smoking and breast cancer prior to reading the message, a variable that was not measured. Another explanation is that self-affirmed participants may have paid less attention to aspects of the leaflet not specifically personally relevant to them. As self-affirmed participants accepted the message about alcohol and breast cancer, their attention may have been focused on central aspects of the message more than those who were non-affirmed. Those who were non-affirmed may have focused on information irrelevant to the personal threat, and thus recalled it more accurately, as a distraction. Finally, the findings may be indicative of self-affirmed participants paying less attention to the message as a whole, and less in-depth processing. If self-affirmed participants did engage in less in-depth processing then changes in message acceptance were likely to be short-lived. Contrary to this self-affirmation produced durable changes on measures of personal acceptance.

Examining the responses of those at lower risk, the present study revealed self-affirmed participants reported reduced negative affect associated with the message, and perceived themselves to be less likely to experience a range of health disorders not targeted by the message. Thus for lower risk participants self-affirmation appeared to make them feel less vulnerable, both to other disease and in terms of worry about their risks from alcohol. In the present study women drinking low levels of alcohol, were in some respects provided with a mixed message, both suggesting that even a single drink a day could increase their risk, but also that women should avoid drinking more than 14 units a week. Thus though the message may have caused women drinking low levels of alcohol to be concerned, they were likely to perceive the message as less negative and personally relevant as those drinking more excessively. The results of the present study might suggest that self-affirmation prior to a message that causes little threat to a participant's self-integrity could lead to feelings of invulnerability. Alternatively, however, the reduction of negative affect associated with the message in those drinking within safe limits, might not indicate a lack of concern over health threats but be an accurate reflection of their risk. Further research is needed to determine the effects of self-affirmation on those not presented with a threat. From an applied perspective, however, those at higher risk provide a more interesting group to study the effects of self-affirmation, firstly because this group is in the greatest need of change, and secondly because this is where biased processing is most likely to occur.

Thus the present thesis focuses on higher risk participants to investigate the effects of self-affirmation.

Limitations

The present study found evidence consistent with the hypothesis that self-affirmation could reduce biased processing of negative, personally-relevant information. From the present findings it is not clear, however, how self-affirmation affects participants' processing of a health message. For example, Ruiter, Abraham and Kok (2000) argue that research examining the effects of self-affirmation on the processing of health messages is unclear about whether participants systematically process the information or engage in more heuristic processing. This criticism is also true of the present study. Indeed self-affirmation may have acted to promote an "agreeableness" mindset. That is, participants may have appeared to accept the message to greater extent, but in fact not done so through thoughtful consideration of the message but heuristic processing. If this were the case it would contradict Steele's arguments that self-affirmation provides a source of self-objectivity, allowing the consideration of threatening information that would otherwise be defensively processed. The present study does provide some evidence consistent with self-affirmed participants processing the information systematically. For instance, the effects on message acceptance were durable, in line with systematic processing (Petty & Wegner, 1999). Furthermore, the effects of self-affirmation on risk perceptions were specific to those targeted by the message, suggesting self-affirmed participants were not agreeing that they were at risk of disease when no risk information was presented. To answer Ruiter et al.'s (2001) call for further tests of self-affirmation on depth of processing, Studies 4 and 5 will include measures of self-reports of message scrutiny, and sensitivity to message strength argued by Petty and Cacioppo (1986) to be indicative of depth of processing.

Study 4 also provides an improved measure of recall of information than that used in the current study. In the present study the items may not have accurately reflected participants' recall of facts in the message as the items used *agree / disagree* scales. This may have resulted in participants reporting their opinions as opposed to their recall of the information. To improve on this measure of recall, Study 4 includes a free-recall task after a one-week delay. This also provides another measure of depth

processing (Petty & Cacioppo, 1986), while also allowing a further test for possible biases in participants' recall.

Another limitation of the current study is that the negative affect measures used did not distinguish fear experienced while reading the message and negative affect as consequence of accepting the message. It is possible that non-affirmed and self-affirmed participants did not differ in terms of fear experienced while reading the information, but that those who were non-affirmed subsequently engaged in processes to reduce fear and worry associated with the message. Study 6 distinguishes these two processes and extends the measures by which negative affect is measured.

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Summary

The findings of this study clearly support the idea that self-affirmation can encourage people to be less, rather than more, defensive when faced with threats to the self. The relative permanency of the effects obtained here suggest self-affirmation may have potential as an applied intervention. Likewise, the fact that the effects were specific to the outcome targeted and those for whom the message was most relevant. Self-affirmation appeared to promote personal message acceptance rather than general message acceptance.

The results of Study 1 suggest that a task focusing participants' attention on their central values can reduce biased processing of personally-relevant health information. The values essay technique of self-affirmation employed in Study 1 was clearly successful. However, it also has some practical drawbacks. For instances it is time consuming for participants to complete, making this method impractical for settings that require a relatively quick and straightforward technique of self-affirmation. The practical constraints of this method led to a search for an additional self-affirmation technique for use in the current thesis. A variety of ways of inducing self-affirmation have been adopted by researchers: these include the completion of value scales (Galinsky, Stone, & Cooper, 2000; Koole, Smets, van Knippenberg, & Dijksterhuis, 1999; Sherman et al., 2000; Spencer et al., 2001; Steele & Liu, 1983; Tesser & Cornell, 1991), writing statements corresponding to a central value or an action taken pride in (Fein & Spencer, 1997; Jones, Pelham, & Mirenberg, 2002; Klein, Blier, & Janze, 2001; Sherman et al., 2000; Tesser, Crepaz, Collins, Cornell, & Beach, 2000), and the use of positive personality feedback on traits (Blanton, Cooper, Skurnik, & Aronson, 1997; Cohen et al., 2000; Greenberg, 1993; Steele, Spencer & Lynch, 1993). The variety of methods is indicative of the various ways in which it is assumed people can engage in self-affirmation (Steele, 1988). However, these different methods are not also without their drawbacks and practical constraints. Therefore, three studies were conducted to test a method of self-affirmation that was developed to overcome some of the problems inherent in the existing methods, and provide a practical self-affirmation technique for use in the current thesis.

Techniques of self-affirmation

According to Steele (1988) value affirmations provide an effective means of affirming one's self-concept. Many studies have based their self-affirmation manipulations on the Allport-Vernon-Lindzey values scale (AVLS; Allport, Vernon, & Lindzey, 1960). Allport et al. identify six values: theoretical, economic, aesthetic, social, political and religious. Typically, self-affirmation techniques based on this approach require participants first to rank or complete an inventory to indicate their central values. This information is then used either to pre-select participants (e.g.,

Steele & Liu, 1983) or assign them to a condition in which they complete a subscale corresponding to their selected value (e.g., Tesser & Cornell, 1991). Those completing a control task typically complete a subscale corresponding to a value that they rated as unimportant. Other methods drawing on Allport's work require participants to write statements or essays about an important value (Fein & Spencer, 1997; Sherman, Nelson, & Steele, 2000).

The AVLS has proved to be an effective means of self-affirmation in a number of different experimental settings (Galinsky, Stone, & Cooper, 2000; Koole, Smets, van Knippenberg, & Dijksterhuis, 1999; Sherman et al., 2000; Spencer et al., 2001; Steele & Liu, 1983; Tesser & Cornell, 1991). However, it is not without problems. Practically, using the AVLS requires establishing participants' core values and assigning each participant a particular AVL subscale. There are, however, some settings in which such an approach is not feasible, such as when running large numbers of participants simultaneously. Time constraints may also limit the feasibility of the essay-based methods. More prosaically, the language used in items on the AVLS can feel antiquated and the way in which the values are measured dated. For example, items such as, "Are you more interested in reading accounts of the lives and works of men such as: (a) Alexander, Julius Caeser, and Charlemange; (b) Aristotle, Socrates, and Kant?" may not provide the most appropriate means of affirming modern day young adult's values, who often comprise the samples in the present thesis. Developing a method that does not require pre-testing or assignment to different value scales, and that uses more contemporary language and measurement of values, would provide a useful addition to the available methods of self-affirmation, especially if it proved suitable for use in large-scale and more applied settings.

One alternative approach, used by Reed and Aspinwall (1998), is the "Personal Attribute Inventory", in which all participants are given the opportunity to self-affirm the value of kindness, by recalling and describing incidences in which they completed kind acts. Reed and Aspinwall argue that this single value is important and desirable to most people, and it therefore provides an effective means of self-affirmation (1998, p. 107). In not requiring questions to be tailored to individuals, this method clearly has many practical advantages over the use of the AVLS. However, there are clearly problems in assuming that one value is central and important to all participants. In data

from Study 1 and pilot work, of 50 participants who were asked to select their most important value, only 4 chose kindness as their most central value. Other values such as trustworthiness ($N = 13$) and friendliness ($N = 13$) were selected more frequently. Thus a single value may not provide an adequate source of affirmation for all participants. Moreover, the use of a single value creates the problem of finding a suitable control task, an issue that also affects many other methods of self-affirmation.

Reed and Aspinwall (1998) used as their control task a personal opinion survey in which participants indicated their agreement with trivial opinion statements, such as, "I think that fruit makes the best desert". Where participants agreed with an opinion they were asked to write a short statement to explain why. However, clearly there are some differences between the control and self-affirmation tasks, any of which might be responsible for the effects found (Reed & Aspinwall, 1998). For example, unlike their experimental condition the control task did not incorporate a recall element (something that Reed & Aspinwall themselves acknowledge, 1998, p. 125). This lack of equivalent controls is not unique to their method. For example, Cohen et al. (2000; study 2) provided affirmed participants with positive personality feedback, followed by an interview highlighting their particularly high score. In comparison, non-affirmed participants received neither feedback nor interview. Essay techniques may also include controls that vary on more than one dimension from the experimental condition. Some techniques vary both the importance of the value and the task target, such that participants either describe how a value is important to them, or how an unimportant value could be significant to another person (Fein & Spencer, 1997). Other essay techniques use a neutral control task, such as recall of food and drink consumption (Cohen et al., 2000; study 1), or provide no control task at all (Klein et al., 2001). Use of these non-equivalent control conditions reduces the ability to determine which aspects of the self-affirmation manipulation are responsible for its effects. For example, rather than the effects of the manipulation being a result of affirming personal values or strengths, simply recalling positive events or providing participants with a distraction from the threat could account for the findings.

The search is on for a method of self-affirmation that combines some of the strengths of Reed and Aspinwall's method – universal applicability – with those of other approaches in terms of values – sufficiency of values – while having a directly

equivalent control task, yet not requiring individual tailoring for every participant. For the purpose of the present thesis, developing such a technique, which has practical benefits, is up to date in its measurement of values, and thus relevant to the samples used, has some advantages over more traditional techniques. This is particularly the case for studies that required a method that is quick and easy to apply on a large scale, such as in Study 4 (an Internet based study). Thus in this chapter I describe the development of a self-affirmation technique with the following properties: a) the ability to make salient central and positive aspects of the self-concept while being, b) easy and practical to administer, c) using values expressed in ways appropriate and meaningful to modern samples, and d) possessing an equivalent control condition. Bearing these criteria in mind, materials were developed based on the Values in Action (VIA) Strengths scale (Peterson & Seligman, 2004; see also Seligman, 2002), in which participants focus upon their personal strengths. An equivalent control was designed to be as similar to the experimental manipulation as possible, with participants completing the same VIA scale but focusing on a celebrity's strengths as opposed to their own.

The Values in Action (VIA) Strengths scale consists of 250 items, measuring 24 key strengths, that fall under the following headings: Wisdom and Knowledge, Courage, Humanity, Justice, Temperance, and Transcendence. The scale was developed from philosophy, eastern and western religions, as well as contemporary views of virtues and character strengths. Not only does the scale cover an extensive range of values, but it also has the benefit of using up-to-date language.

The values identified in the character strength questionnaire have obvious parallels with those of the AVLS. For example, the AVLS's "theoretical value", encompassing the pursuit of truth and a critical and rational perspective (Allport et al., 1960), resembles VIA scale's *wisdom and knowledge* (e.g., "I love to learn new things", "I value my ability to think critically"). Allport's "aesthetic man", who views beauty to be equivalent to or to exceed the importance of truth, may hold strengths in *transcendence* (e.g., "I experience deep emotions when I see beautiful things."). The "social man", whose "highest value... is the love of people" (Allport et al., 1960, p. 5), could be seen to possess interpersonal strengths under the category of *humanity* (e.g., "I am never too busy to help a friend", "I can express love to someone else"). Finally,

"religious" values are reflected in Peterson and Seligman's concept of *spirituality* (e.g., "I am a spiritual person"). In comparison to the AVLS, the VIA classification of strengths offers a more up-to-date methodology for use as a self-affirmation technique. By using an adapted VIA classification of strengths questionnaire it was hoped central values would be made salient, offering participants an opportunity to consider their personally important, self-defining values. Steele (1988) argues that reflection on such values can be self-affirming, and therefore this technique should provide an effective means of inducing self-affirmation.

Measuring the effectiveness of self-affirmation manipulations

In testing this method, firstly the changes that would be expected, if a technique successfully induces self-affirmation, have to be addressed. In fact, few studies include manipulation checks that specifically test what effect self-affirmation has on self-perceptions. Steele (1988) argues that providing opportunities to confirm, endorse and bolster important aspects of the self, such as values, should provide a means of self-affirmation and impact upon self-integrity. In one study that has addressed the effects of self-affirmation, Steele & Liu (1983) showed that after completing a values salience manipulation, in which participants focused on their central value, participants made more positive ratings of their self-concepts, in comparison to a control task. Other studies have included measures of positive self-feeling (Sherman, Nelson, & Steele, 2000) and self-regard (Cohen et al., 2000), and found increases, albeit marginal (Cohen et al., 2000) on these measures. Based on manipulation checks in existing studies and the arguments of Steele (1988) the following measures were included as a test of the effectiveness of the self-affirmation task being developed: the salience of positive, central, and valued aspects of the self-concept, and the positivity of participants' self-regard.

Participants' mood and state self-esteem were also measured, with the aim of providing further insight into the possible mechanism of self-affirmation. In general, there is currently a lack of research investigating the underlying mechanisms of self-affirmation (Koole et al., 1999). Some studies have included measures of mood, to test claims that self-affirmation may be mediated not by self-worth but by other processes such as affect (Koole et al., 1999; Tesser et al., 2000). Results from a variety of studies have consistently demonstrated that completion of a self-affirmation manipulation

either independently (Steele & Liu, 1983) or in conjunction with a self-threat, has no impact on explicit mood ratings (Cohen et al., 2000, Fein and Spencer, 1997; Klein et al., 2001; Sherman et al., 2000). However, these studies typically use single item mood measures that may not have the sensitivity to examine changes in affect associated with self-affirmation. More convincing evidence is provided by Steele et al. (1993), who manipulated mood, and found that increasing positive affect did not reduce rationalisation in the same way as self-affirmation techniques. This finding supports their argument that self-affirmation does not simply act as a boost to current mood. However, Raghunathan & Trope, (2002) investigated the impact of boosting positive mood upon processing of negative health information. Their findings suggest that when negative health information has long-term benefits, positive mood can act as resource to overcome defensive reactions to self-threats. Thus changes in affect may provide a plausible mediator of the effects of self-affirmation. The present study includes a measure of explicit affect to test this possibility.

Past research has also provided conflicting findings regarding the impact of self-affirmation on state self-esteem. Unlike trait self-esteem, an enduring form of self-esteem or affection for one's self (Brown, 1993, 1998; Brown, Dutton, & Cook, 2001), state self-esteem refers to "the aspect of a person's feeling of self-worth that is more subject to change" (Chang & MacKenzie, 1998, p. 2325). Measuring state self-esteem provides one measure of the effects of self-affirmation on participants' feeling of self-worth. Steele (1988) predicts that self-affirmation should restore participants' self-integrity or positive experience of the self. However, it is unclear whether this necessarily indicates that self-affirmation should increase in self-worth. For example, self-affirmation may not bolster feelings of self-worth prior to a threat, but may act as a restorative process activated by a self-threat. Indeed, using positive personality feedback as a self-affirmation manipulation, Fein and Spencer (1997) found increases in state self-esteem (see also Arndt & Greenberg, 1999; Greenberg et al., 1992). However, the use of a value salience task has been found to have no impact upon state self-esteem, either in conjunction with a self-threat (Galinsky, Stone, & Cooper, 2000), or independently (Spencer & Steele, 1990; cited in Fein & Spencer, 1997). These findings may represent subtle differences between self-affirmation techniques. Value salience tasks, may provide a means of restoring participants' self-integrity, without

necessarily boosting perceptions of self-worth. Including a measure of state self-esteem in the present study will provide an additional test of whether self-affirmation affects state self-esteem, and help inform our current understanding of whether self-affirmation is necessarily mediated by changes in state self-esteem.

Theoretical questions also remain regarding the effect of dispositional self-esteem upon the effectiveness of self-affirmation techniques (Cohen et al., 2000). Steele et al. (1993) proposed that those with high self-esteem are more resilient when faced with self-threats. According to them, by possessing a more favourable self-concept, affirming the self is made easier, with those with high self-esteem having more positive aspects available as resources to combat threats to the self. Stone and Cooper (2003) found that priming positive self-attributes reduced attitude change in a dissonance task, but only for those with high self-esteem. Stone and Cooper argue that the primes may have been less self-descriptive for those with low self-esteem, rendering them less likely to be employed as a resource when faced with a dissonant act. The same could also be true for other self-affirmation techniques. For example, those with low self-esteem may find positive feedback on a personality test less believable and consequently less effective. Thus, those with low self-esteem may face difficulties in self-affirming both naturally, due to fewer resources with which to self-affirm, and after a self-affirmation manipulation, with techniques providing less relevant and credible sources for affirming ones self.

On the other hand it is at least arguable that low self-esteem individuals might benefit more from self-affirmation manipulations. People with low self-esteem tend not to engage naturally in processes to accentuate their personal strengths (Baumeister, Tice, & Hutton, 1989; Beauregard & Dunning, 2001), even when faced with a self-threat (Boney-McCoy et al., 1999; Sommer & Baumeister, 2002), unlike those with high self-esteem who naturally engage in these affirming processes (Boney-McCoy et al., 1999; Brown & Dutton, 1995; Dodgson & Wood, 1998). Consequently, low self-esteem individuals may benefit more from the additional prompting provided by a self-affirmation manipulation that focuses attention on personal strengths, in comparison to high self-esteem individuals. Indeed, Spencer et al. (2001) suggested that those with low self-esteem may have difficulty spontaneously engaging in self-affirmation following a self-threat, but may adequately engage in these processes following a

values salience task. Furthermore, research examining consideration of personal strengths suggests that those with low self-esteem find tasks that involve selecting from among, rather than generating a list of, their strengths less intimidating, and respond as positively as those with high-self-esteem (Tower of Strength Activity; Sia & Czuchry, 1997; Sia, Czuchry, & Dansereau, 1999).

Clearly, there remain questions over the role of dispositional self-esteem on the effectiveness of self-affirmation manipulations. However, because completion of self-esteem measures has been found to be self-affirming in those with high self-esteem (Steele et al., 1993), measuring dispositional self-esteem as a possible moderator is rarely done. By measuring the effects of the self-affirmation technique independent of a threat manipulation this problem was overcome. The current study included the Robins, Hendrin and Trzesniewski (2001) measure of trait self-esteem. Study 1 demonstrated that this measure is significantly correlated with the Rosenberg Self-esteem scale, and was include to test whether the self-affirmation technique developed in the present chapter moderated the impact of self-affirmation upon salience of positive aspects of the self, as well as possible mediators, such as mood, state self-esteem and self-regard. The inclusion of this measure allowed the assessment of the effectiveness of the manipulation at different levels of self-esteem.

Current Studies

This chapter outlines three studies testing the effectiveness of the VIA character strength questionnaire as a self-affirmation manipulation. Study 2a set out to test whether the self-affirmation and the control task differed in their ability to make salient important and valued self-conceptions. Study 2b was conducted to confirm that the control condition did not lead to social comparisons that had negative effects for participants' self-views. To do this the celebrity control was compared to a more traditional neutral control (recall of food). Finally, Study 2c provided a stronger test of the new self-affirmation task and control, using different items to measure the effects of the tasks, and a more elaborate cover story. Study 2c also tested the effects of the celebrity control against a traditional value essay control technique. The effects of the manipulation on affect, state self-esteem and self-regard were measured, and whether the effects of self-affirmation on these variables were moderated by dispositional self-esteem, was also tested.

Study 2a

Method

The self-affirmation and control tasks

For use as a practical self-affirmation manipulation in an experimental setting, the VIA scale was shortened and adapted (e.g., Americanisms changed) to 30 items. The items were selected to be representative of the original 24 character strengths. For example, to measure the strength of creativity, which is defined as "thinking of novel and productive ways to do things" (Peterson & Seligman, 2004), the item "Being able to come up with new and different ideas and ways of doing things is one of my strong points" was selected to be most representative. By covering a range of attributes it was hoped that the adapted Character Strength Questionnaire would provide all participants an opportunity to focus on personally important strengths and values. Examples of items from each of the main categories of values are in Table 3.1 and an exhaustive list of the 24 character strengths and their corresponding items are presented in Appendix C.

Table 3.1. *Examples of Items Selected to Measure each of the Character Strengths*

Value	Item
Wisdom and Knowledge	"Being able to come up with new and different ideas and ways of doing things is one of my strong points." "I value my ability to think critically."
Courage	"I must stand up for what I believe in even in the face of strong opposition." "I always admit when I am wrong."
Humanity	"I am never too busy to help a friend." "I go out of my way to cheer up people who appear down."
Justice	"I treat all people equally regardless of who they might be." "I really enjoy being part of a group."
Temperance	"I never seek vengeance." "I do not act as though I am a special person."
Transcendence	"I experience deep emotions when I see beautiful things." "Despite challenges, I always remain hopeful about the future."

Note. Adapted from *Character Strengths and Virtues: A Handbook and Classification.* Peterson, C, and Seligman, M. E. P., (2004). Oxford: Oxford University Press. Copyright 2004 by Values in Action Institute. Reprinted with permission of Values in Action Institute.

An equivalent control questionnaire was also developed. Past attempts to develop self-affirmation techniques not based on the AVLS have struggled to provide equivalent controls. The present studies sought to address this issue by designing a control task as similar as possible to the self-affirmation manipulation, with only the central element of focusing on *personal* values removed.

Two control conditions were initially piloted. Participants, instead of themselves, were asked to rate a well-known celebrity or someone of the same sex as themselves who they would like to get to know better, on the same 30 attributes taken from the VIA scale. As the majority of studies conducted in this thesis use female participants, to reduce the similarity between participants and the celebrity target a male celebrity was chosen. The acquaintance control led some participants to focus on things they valued about themselves, and things that were personally important to them, while the celebrity control did not. On the basis of these preliminary data, the acquaintance control condition was dropped in favour of the celebrity control.

As well as testing the adequacy of the self-affirmation task, the present studies set out to test the sufficiency of the celebrity control task. For the purpose of this thesis the footballer David Beckham was used as the celebrity figure. (However, this questionnaire could easily be adapted to any celebrity figure familiar to a sample and about whom they would be happy to make personal strengths judgements).

Participants in both conditions were presented with 30 strength statements and, as with the original VIA scale, were asked to respond to each statement on a 5-point response scale. In the self-affirmation condition participants rated how well each statement described them personally (*very much like me / like me / neutral / unlike me / very much unlike me*), whereas in the non-affirmed condition, participants rated how well each statement described David Beckham (*very much like him / like him/ neutral / unlike him / very much unlike him*).

Participants

Participants were 242 high school and university students recruited to the study either from classroom and laboratory settings, or by opportunity sampling on the university campus. In some settings there was a time limit of 5 to 10 minutes for

completion of the questionnaire, which was beyond the experimenter's control. However, participants were not aware of this and were told simply to complete the questionnaire at their own pace. Those participants ($N = 45$) who did not finish the character strength questionnaire were excluded from the data. The final sample ($N = 197$) consisted of 62 undergraduates (mean age 19.9 years; 37 females, 25 males) and 135 high school students (mean age 17.4 years; 86 females, 49 males).

Character Strength Questionnaire (Appendix D)

Written instructions invited participants to complete a questionnaire designed to measure judgements about personal strengths, and participants were presented with the 30 strength statements. Participants were instructed "Please choose one option in response to each statement. If you are not sure choose the response that most closely reflects your thoughts". Participants were informed that all of the questions reflected statements that many people would find desirable, but they were to answer only in terms of whether the statement described what they (David Beckham) were like, and to be as honest and accurate as possible. After completing the strengths questionnaire, participants in the non-affirmed condition were asked: "What is your overall opinion of David Beckham?". Responses were given on a 7-point scale, *Extremely negative* (0) to *Extremely positive* (6). This rating was not found to be significantly associated with any of the outcome variables. The correlations that most closely approached significance were ratings of whether participants had focused on things that were personally important, $r(86) = .20$, $p = .07$, and whether the task made them think about things they valued, $r(84) = .18$, $p = .11$.

Outcome Measures

The opening items on the outcome measure questionnaire assessed to what extent the questionnaires had focused participants' attention on positive and valued aspects of themselves and were completed in the following sequence: "The questionnaire made me think about positive aspects of myself", "The questionnaire focused my attention on who I am", "The questionnaire made me aware of things I value about myself", "The questionnaire made me think about things that are

personally important to me", "The questionnaire made me think about my values (the principles and standards by which I try to live my life)". Participants responded on a 5-point response scale (*Strongly disagree / Disagree / Neutral / Agree / Strongly agree*). These items comprised a measure of salience of positive and central aspects of the self-concept after completing the self-affirmation or control tasks. Next came a single item measuring participant *self-regard* (from Sherman et al., 2000), "How do you feel about yourself?", measured on a 7 point scale, 0 = *poorly*, 6 = *extremely positive*. Each participant then completed either items measuring current mood or a state self-esteem scale.

Mood. Participants ($N = 70$) completed an adjective checklist adapted by Raghunathan and Trope (2002) from the Mood Adjective Checklist (MACL; Nowlis, 1965). Participants were presented with 8 adjectives, two measuring positive mood (happy / elated), two items negative mood (sad / depressed), and four filler items (tense / tired / calm / energetic). Participants were instructed to indicate to what extent each adjective described how they currently felt, using a four point scale anchored at *Definitely does not apply to my feeling at this moment* (0) / *definitely does apply to my feeling at the moment* (3).

State Self-esteem. Participants ($N = 72$) completed the Current Thought Scale (Heatherton & Polivy, 1991) measure of state self-esteem. The scale consists of 20 items, which measure three aspects of self-esteem: performance (e.g., "I feel confident in my abilities"), appearance (e.g., "I feel dissatisfied with my weight"), and social (e.g., "I feel others respect and admire me"). Participants indicated on a 5-point scale whether each statement applied to them at the current time (*Not at all / A little bit / Somewhat / Very much / Extremely*).

Dispositional self-esteem. The final item, completed by all participants, was the one-item Robins et al. (2001) trait self-esteem measure, described in Chapter 2. Study 1 (Chapter 2) found that the single item measure was significantly correlated, $r(56) = .57$, $p < .001$, with Rosenberg's (1965) trait self-esteem scale.

Procedure

Participants were asked to take part in a psychology project examining personal strengths. They were randomly assigned to condition, and completed either questions measuring mood or state self-esteem. Where participants completed the experiment in groups they were asked to do so in silence.

Results

Study 2a was primarily intended to test what effect the character strength and control questionnaire had on the salience of positive and valued aspect of the self, mood, state self-esteem, and self-regard, and whether the effects were moderated by trait self-esteem.

Effects of self-affirmation manipulation

The data were analysed using one way ANOVAs, with questionnaire condition (self-affirmed or non-affirmed) as the between-participants variable. The data are in Table 3.2. Analysis revealed no significant differences between self-affirmed and non-affirmed participants' positive, $F(1, 69) < 1, p = .60$, or negative mood, $F(1, 68) = < 1$, $p = .90$, after completing the character strength questionnaire. Neither were there significant effects of self-affirmation condition on state self-esteem, $F(1, 71) < 1, p = .48$. or self-regard, $F(1, 181) < 1$, $p = .63$.

Table 3.2. *Effect of Self-affirmation Condition on Mood, Self-regard and Self-esteem.*

Outcome measure	SA	NA
Positive affect	1.58 (0.64)	1.55 (0.60)
Negative affect	0.36 (0.47)	0.33 (0.59)
State self-esteem	66.79 (11.06)	65.56 (14.35)
Self-regard	3.54 (0.82)	3.47 (1.02)

Note. Standard deviations are in parentheses. SA = self-affirmed; NA = non-affirmed (applies throughout this chapter)

Mean responses of the two groups to the measures of the salience of positive and valued aspect of the self are in Table 3.3 and Figure 3.1. One-way ANOVAs, with questionnaire condition (self-affirmed or non-affirmed) as the between-participants variable, confirmed that the two questionnaires significantly differed in their impact on the salience of central and positive aspects of the self-concept. (The degrees of

freedom for the different analyses vary slightly as some participants did not answer all the questions.) Self-affirmed participants reported that completing the questionnaire made them think more about positive aspects of themselves, $F(1, 195) = 77.23$, $p < .001$, focus more attention on who they were, $F(1, 195) = 117.96$, $p < .001$, made them more aware of things they value about themselves, $F(1, 191) = 33.34$, $p < .001$, made them think about things personally important to them, $F(1, 189) = 31.72$, $p < .001$, and made them think more about their personal values, $F(1, 110) = 11.70$, $p = .001$, than those in the non-affirmed condition.

Table 3.3. *Mean Responses of Self-Concept Salience as a Function of Self-affirmation.*

Outcome measures	SA (N = 100)	NA (N = 94)
The questionnaire made me:		
Think about positive aspects of self	0.71 (0.77) ^{***a}	-1.68 (0.89) ***
Focus my attention on who I am	0.61 (0.72) ***	-1.40 (0.85) ***
Aware of what I value about myself	0.42 (0.78) ***	-1.68 (1.03) **
Think about things personally important to me	0.54 (0.75) ***	-1.82 (1.04)
Think about my values	0.04 (0.81)	-1.26 (1.03) ***

Note. Disagreement with the self-concept salience questions was scored negatively (-2, -1), neutral responses were scored as 0, and agreement received a positive score (+1, +2).[a]One sample t-test against midpoint. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

One-sample t-tests were employed to test in which direction non-affirmed and self-affirmed participants differed. Analysis revealed that both the non-affirmed and self-affirmed groups differed significantly from the neutral mid point (0) on all but one of the items (see Figure 3.1). Whereas the self-affirmed group's responses to each of the salience of self-concept statements were above neutral, indicating agreement, the non-affirmed participants' responses all fell below neutral, indicating disagreement.

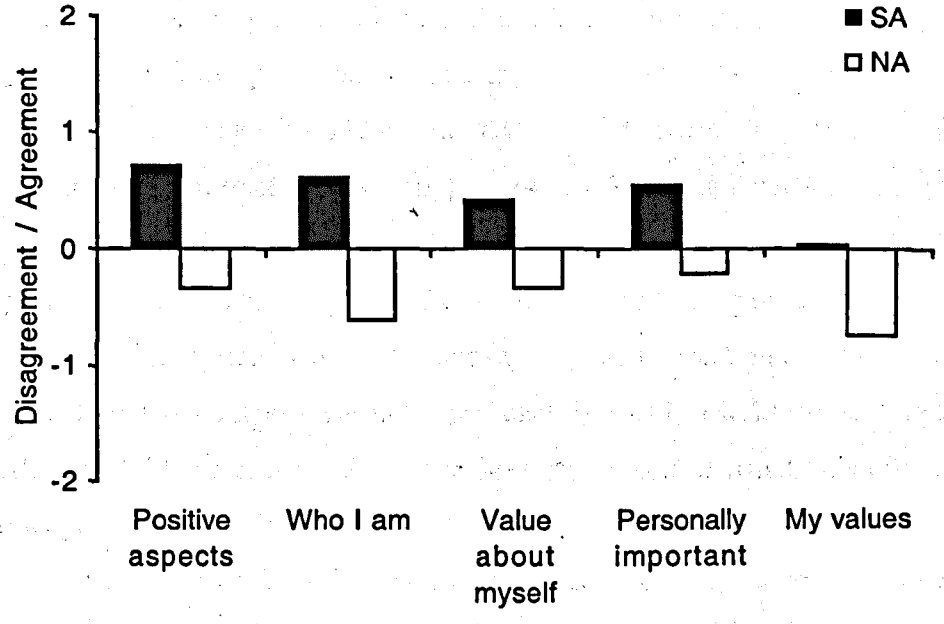

Figure 3.1. Self-concept salience as a function of self-affirmation condition.

In comparison to the control questionnaire, the self-affirmation task focused participants on central and valued aspects of the self. The self-affirmation technique was not found to influence mood, state self-esteem, or self-regard.

Dispositional self-esteem as a moderator

Moderated regression (Baron & Kenny, 1986) was used to examine whether dispositional self-esteem interacted with self-affirmation manipulation. Data were analysed using two-step hierarchical regression analyses, followed by tests of simple slopes (Aiken & West, 1991). At step one, the main effects of condition (dummy coded 1, 2) and self-esteem were entered, and the Condition X Self-esteem interaction at step two.

Salience of positive and valued aspects of the self. The first four items measuring the impact of questionnaire completion upon salience of central aspects of self-concept were combined into a single item measuring self-concept salience

(Cronbach's alpha = .85). The fifth item measuring salience of central values was not included in this analysis, as this item was added later to the questionnaire and was completed by fewer participants, reducing the power of the analysis.

Regression analysis revealed that both self-affirmation condition, $\beta = .62, p < .001$, and dispositional self-esteem, $\beta = .14, p = .032$, predicted salience of positive and central aspects of participants' self-concept, such that both those who self-affirmed and also those who had higher self-esteem reported having thought more about positive and important aspects of themselves. The interaction of condition and dispositional self-esteem was not significant, $\beta = -.17, p = .21$, indicating there were no differential effects of dispositional self-esteem on self-affirmation's effect on self-concept salience.

Positive mood. Further moderated regressions were carried out to examine whether dispositional self-esteem moderated the effects of self-affirmation on mood, self-regard, or state self-esteem. The first analysis, predicting positive mood, revealed dispositional self-esteem as a significant predictor, $\beta = .31, p = .012$. The interaction of dispositional self-esteem and condition also approached significance, $\beta = -.23$, $p = .059$, but condition alone did not, $\beta = .10, p = .42$. The nature of the interaction between condition and dispositional self-esteem was explored using simple slope analysis (Aiken & West, 1991). Regression lines were examined at three levels of the hypothesized moderator (the mean level and one standard deviation above and below the mean). Figure 3.2 shows the relationship between self-affirmation and positive mood as a function of dispositional self-esteem, indicating that for those with low self-esteem self-affirmation as a predictor of positive mood approached significance, $\beta = .34, p = .054$, while self-affirmation had little effect on the mood of those with moderate, $\beta = .12, p = .33$ or high self-esteem, $\beta = -.10, p = .51$.

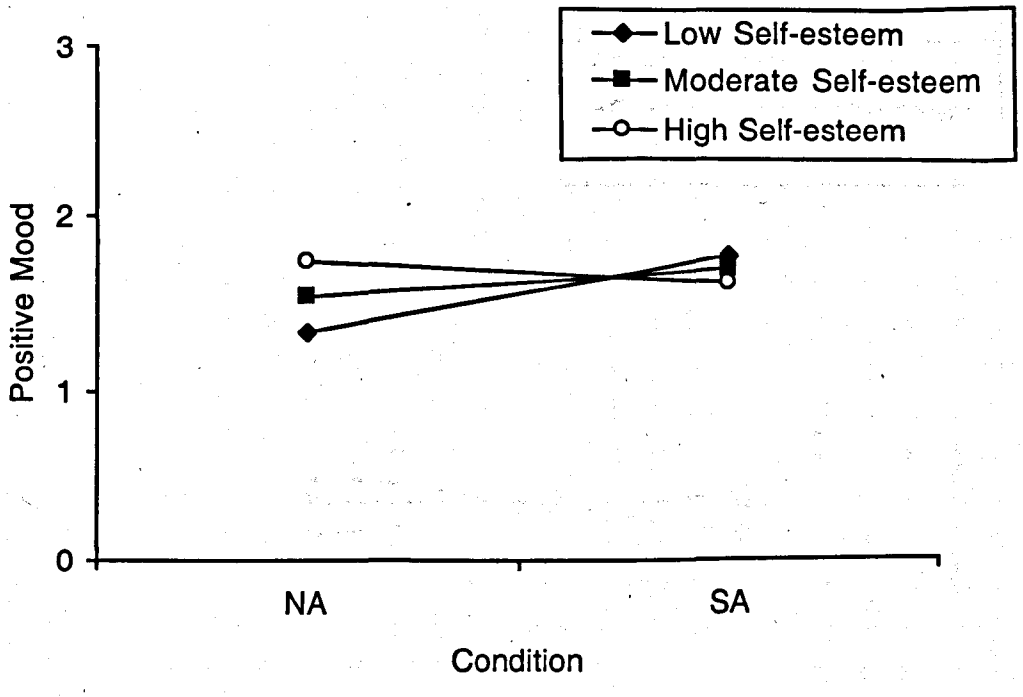

Figure 3.2. Interaction between self-affirmation condition and dispositional self-esteem on positive mood: Simple slopes for condition at three levels of self-esteem.

Negative mood. A second analysis for negative mood yielded similar results, with dispositional self-esteem both alone, $\beta = -.31$, $p = .013$, and in interaction with self-affirmation condition, $\beta = .28$, $p = .019$, but not self-affirmation condition itself, $\beta = -.033$, $p = .79$, significantly predicted negative mood. Figure 3.3 shows the relationship between self-affirmation and negative mood as a function of dispositional self-esteem, indicating that the decrease in negative mood following self-affirmation for those with low self-esteem approached significance, $\beta = -.35$, $p = .054$. Self-affirmation had little impact on the negative mood of those with moderate, $\beta = -.06$, $p = .60$, and high self-esteem, $\beta = .21$, $p = .18$.

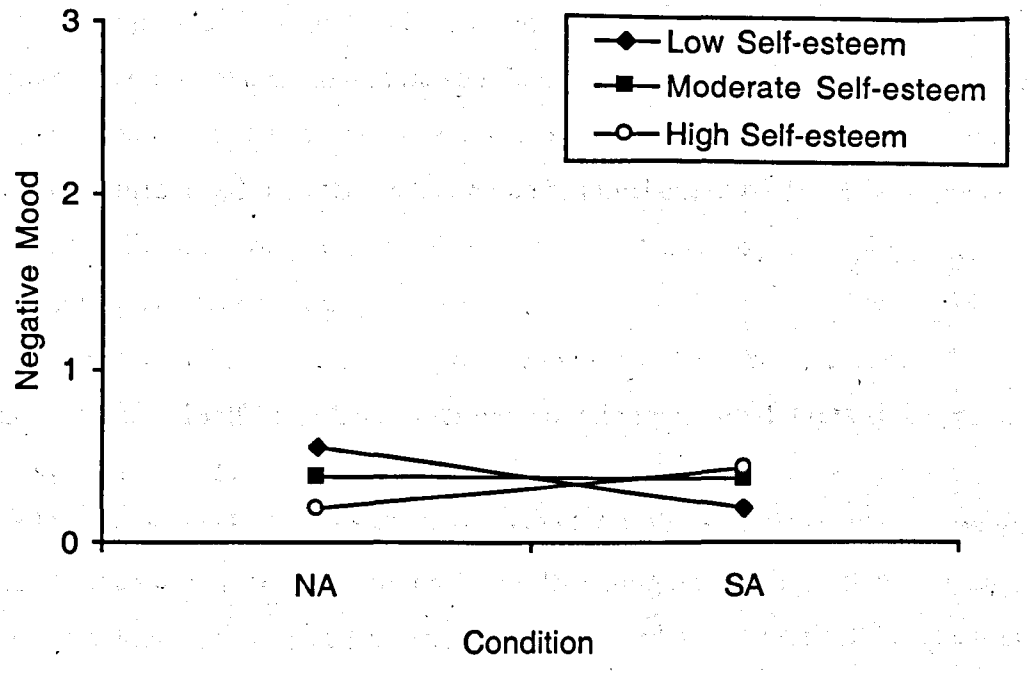

Figure 3.3. Interaction between self-affirmation condition and dispositional self-esteem on negative mood: Simple slopes for condition at three levels of self-esteem.

State self-esteem. The analysis of state-self esteem revealed that dispositional self-esteem, $\beta = .77$, $p < .001$, but neither self-affirmation condition, $\beta = .07$, $p = .40$, nor the interaction, $\beta = -.13$, $p = .40$, predicted state self-esteem. Higher levels of dispositional self-esteem were associated with greater state self-esteem.

Self-regard. A final analysis, examining the self-regard item, revealed that both self-affirmation condition $\beta = .24$, $p = .047$, and dispositional self-esteem, $\beta = .77$, $p < .001$, were significant predictors, while the interaction was not, $\beta = -.14$, $p = .17$. Self-regard was found to be at its highest both in those who were self affirmed and in those with high dispositional self-esteem.

Discussion

In comparison to those in the control task, self-affirmed participants were more likely to report having thought about positive, valued and central aspects of their self. There was no evidence that self-affirming resulted in more positive mood, less negative mood, or higher state self-esteem. Thus the effects of self-affirmation were not mediated by changes in these variables.

Study 2a provides initial evidence that the VIA character strength questionnaires provided adequate self-affirmation and control conditions. The experimental condition appeared to make salient positive aspects of the self, on which participants could self-affirm when faced with a self-threat. In contrast the control task did not. The current self-affirmation technique has the benefit of drawing on the contemporary literature on personal values and strengths, is easy to employ, and provides an equivalent control.

Though initial analysis did not provide evidence that the self-affirmation technique increased self-regard, a further moderated regression did reveal the predicted increase in self-regard associated with self-affirmation that has previously been reported by Cohen et al. (2000) and Sherman et al. (2000). Self-affirmed participants reported an increase in the positivity of their self-feeling on the single item self-regard measure, but not on the state self-esteem scale. This finding may reflect the specificity of the measures. The single item may assess a more general sense of positive self-feeling, as opposed to changes in specific aspects of self-esteem (e.g., performance, appearance or social self-esteem) and, as the self-affirmation task did not specifically affirm, for example, participants' appearance or social skills, changes were not seen on the state self-esteem measure.

The present study also revealed that dispositional self-esteem influenced the salience of positive and central aspects of the self-concept, such that in both the non-affirmed and self-affirmed groups those with higher self-esteem reported thinking about more positive and central aspects of themselves, than did those with lower self-esteem. However, following self-affirmation, an increase in salience of positive and central self-characteristics was seen regardless of level of self-esteem. Past research has suggested that those with low self-esteem may benefit less from self-affirmation techniques (Stone & Cooper, 2003). However, the present study suggested that participants with low self-esteem could benefit from the present self-affirmation manipulation.

The findings also provide insights into how dispositional self-esteem interacts with the effects of self-affirmation, particularly in relation to mood. In the non-affirmed group, lower self-esteem was associated with higher levels of negative affect and lower positive affect, with the reverse true for those with higher levels of self-

esteem, a finding consistent with research into the association between low self-esteem and affect (for example, Watson, Suls, Haig, 2002; Wood, Heimpel, Michela, 2003). In the present study, self-affirmation was found to have differential effects on those with high and low self-esteem, boosting the mood of those with low self-esteem and having no impact on positive or negative mood of those with moderate and high self-esteem.

Initial tests suggest that the character strength questionnaire could provide a successful means of making salient positive and central aspects of the self.

Study 2b

Although Study 2a suggested that the character strength self-affirmation technique can provide an effective self-affirmation technique, an alternative explanation for the findings is that the control condition focused participants' attention onto negative aspects of themself. The results for mood could, for example, be reinterpreted to suggest that those with low self-esteem were in a more negative and less positive mood after focusing on the strengths of a celebrity. By focusing on a successful celebrity, participants may have engaged in implicit social comparisons which lead to negative consequences for the self (Stapel & Suls, 2004). For instance, considering the traits of Einstein can lead to participants evaluating themselves negatively on the dimension of intelligence. Thus focusing on David Beckham's strengths may have negative effects for participants' self-evaluations. However, this account of the findings of Study 2a is unlikely for two reason. Firstly, when participants feel dissimilar to a target, social comparisons have little evaluative implications for the self (Pelham & Wachsmuth, 1995). Participants in the current study, and throughout the thesis, are women (and mainly young women), who are unlikely to feel similar to David Beckham. Secondly, Lockwood and Kunda (1997) investigated the impact of social comparisons with superstars. Superstars were only found to influence self-evaluations when they were perceived as relevant to the participants' area of expertise. For example, a superstar football player may have a negative impact on self-evaluations for an aspiring footballer, but not for an aspiring accountant.

This evidence examining the effects of social comparisons suggests that the control condition was unlikely to affect self-evaluation. Nevertheless, Study 2b was

undertaken to test this alternative hypothesis. The results of the celebrity control condition from Study 2a were compared to a second, unrelated control task, recall of food consumption. The food recall control task was chosen because it has been argued to provide a neutral task and has previously been used as a self-affirmation control task (Cohen et al., 2000; Study 1). Though it does not provide a directly equivalent control it does allow the comparison on the celebrity control against a neutral task.

Method

Participants

Participants were 142 high school and university students recruited to the study either in a lecture or a classroom setting. The majority of the sample were female (110 females, 32 males) and were aged between 17 and 40 years of age (mean age 18.6 years).

Recall task

Participants were asked to record in as much detail as possible a list of everything they had eaten in the last 48 hours. They were asked to recall the information as accurately and as in as much detail as they possibly could, for example, including portion sizes and brand names where appropriate. Participants were given three minutes to complete this task.

Outcome Measures

Participants completed the same outcome measures as in Study 2a. In total, 90 participants completed the measure of current mood (Raghunathan and Trope, 2002), and a further 47 participants completed the Current Thought Scale (Heatherton & Polivy, 1991) measure of state self-esteem.

Procedure

Participants were asked to take part in a psychology project examining personal recall, and were randomly assigned to complete either questions measuring mood or state self-esteem.

The data were analysed using one-way ANOVAs, with questionnaire condition (celebrity or food recall) as the between-participants variable. Analysis of participants' positive mood after the task revealed that those in the food control reported being in a significantly less positive mood, $F(1, 127) = 10.36$, $p = .002$, after completing the control task compared to those in the celebrity control condition (Table 3.4). There were no significant differences in participants' reports of negative mood, $F(1, 128) = 2.53$, $p = .12$. The difference in state self-esteem between control conditions approached significance, $F(1, 89) = 3.32$, $p = .07$, with those in the food condition reporting slightly higher state self-esteem. However, there was no significant difference in participants' reported level of self-regard, $F(1, 220) < 1$.

Table 3.4. *Mean Responses to Mood, State self-esteem and Self-regard measures by Control Condition.*

Outcome measure	Celebrity (N = 94)	Food (N = 152)
Positive affect	1.55 (0.60)	1.17 (0.68)
Negative affect	0.33 (0.59)	0.54 (0.73)
State self-esteem	65.56 (14.35)	71.04 (8.84)
Self-regard	3.47 (1.02)	3.42 (0.95)

Note. The data for the celebrity condition duplicates that presented in Table 3.2.

The mean responses on the principal outcome measures are in Table 3.5. One-way ANOVAs, with questionnaire condition (celebrity control or food control) as the between-participants variable, tested whether the two control tasks significantly differed in their impact on salience of central and positive aspects of the self-concept. Those completing the celebrity control disagreed more that the task focused their attention on positive aspects of themselves, $F(1,195) = 4.83$, $p = .029$, and who they are, $F(1,195) = 10.00$, $p = .002$. However, the two tasks did not differ significantly in how much they made participants aware of things they value about themselves, $F(1, 186) < 1$, made them think about things that were personally important to them, $F(1, 185) < 1$, or made them think about their personal values, $F(1, 182) < 1$.

Table 3.5. *Mean Responses of Self-Concept Salience by Control Condition.*

Outcome measures	Celebrity (N = 94)	Food (N = 152)
The questionnaire made me:		
Think about positive aspects of self	-0.33 (0.89)^{***a}	0.06 (0.85)
Focus my attention on who I am	-0.60 (0.84)***	-0.21 (0.88)*
Aware of what I value about myself	-0.33 (1.03)**	-0.36 (0.81)***
Think about things personally important to me	-0.20 (1.04)	-0.27 (0.92)**
Think about my values	-0.74 (1.03)***	-0.73 (1.17)***

Note. Disagreement with the self-concept salience questions was scored negatively (-2, -1), neutral responses were scored as 0, and agreement received a positive score (+1, +2). The data for the celebrity condition duplicates that presented in Table 3.3. [a]One sample t-test against midpoint. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

One-sample t-tests revealed that those in the food condition differed significantly from the neutral mid point (0) on all the outcome measures except that measuring whether the task had focused participants on positive aspect of themselves. For the responses that did differ from neutral, they all fell below neutral, indicating participants reported the recall task did not focus their attention on important and valued aspects of the self.

Discussion

Comparison of the food control and celebrity control revealed little difference in their impact on the salience of values and important aspects of the self. Participants in the celebrity control condition did disagree more strongly that the task made salient positive aspects of the self, and the self (who I am). In this respect the findings could be argued to suggest that the celebrity condition provides a better control, with people focusing less on positive aspects of the self. On the other hand, it could suggest that the celebrity control was having a negative effect on how participants saw themselves, possibly due to making comparisons with a successful other.

The food control reduced participants' reports of positive affect. One explanation could be that recalling diet was a less interesting task, or even meant facing up to unhealthy dietary choices that led to a less positive mood. Interestingly, those in the food recall task also reported marginally higher state self-esteem. This

finding could indicate that the celebrity control task did have a negative effect on participants' self-esteem, possibility due to participants making unfavourable comparison with a successful target. However, Study 2a revealed no differences between the self-affirmed and non-affirmed participants in terms of their state self-esteem, suggesting this explanation is unlikely.

Study 2c

Study 2b provides some evidence that the celebrity control task does not affect participants adversely in comparison to a neutral control task. However, both Study 2a and 2b use unipolar scales to assess the impact of the self-affirmation and control tasks. The use of unipolar scale may suggest to participants the way in which they are expected to respond. In comparison, semantically opposed bipolar scales may provide a more neutral means of measuring the effects of the questionnaires, and reduce any acquiescence bias in participants' responses.

By adapting the way in which the key outcomes were measured, Study 2c was designed to provide a further test of the adequacy of the manipulation and control. Furthermore, in Study 2c the cover story for the tasks was further developed, which allowed the inclusion of more filler items to reduce participants' awareness of what the study was measuring and the likelihood of demand characteristics in participants' responses.

Study 2c also included a more traditional values essay control condition as a comparison for the celebrity control. This task involved participants writing about how their least important value could be important to another person. This allowed the celebrity control to be compared to a traditional values control on the outcome measures. Measures were included to test whether the manipulations influenced how participants felt about themselves. This was included to further test whether focusing attention on a celebrity made participants feel more negatively towards the self, compared to a traditional control task, and whether self-affirmed participants felt more positively towards themselves. Participants were also asked to report whether they made comparisons with the targets, and how similar they felt to the targets used, to assess whether those in the celebrity control condition reported making comparisons that could have negative implications for the self.

Method

Participants

Participants were 143 high school and university students recruited to the study either in a classroom or laboratory setting. The majority of the sample were female (*N* = 102) and were aged between 16 and 26 years of age (mean age 17.6 years of age). Participants were randomly assigned to complete either the personal strengths (N = 47) or celebrity strengths (N = 70) task. A further 26 participants completed the values essay task.

Self-affirmation task or celebrity control

The instructions for the self-affirmation task were the same as those in Study 2a, however, the task was described as a social perception task. Those completing the celebrity control task were told that the study was investigating people's perceptions of themselves, people they know and well-known celebrities. Participants were told that they could be asked questions relating to any of these groups of people. They were informed that some people were going to be asked about other groups of people but they were to think about the qualities of David Beckham. The rest of the instructions were the same as in Study 2a. Two further items were added to the character strength self-affirmation and non-affirmation manipulations, with participants rating themselves or the celebrity on perceptions of trustworthiness, ("My friends can trust me" and "I always try to keep my word" and the equivalent in the celebrity condition). The value of trustworthiness was not explicitly covered in the original character strength questionnaire. However, as pilot work and results of Study 1 suggests that it is one of the most common values to be rated as important, items allowing participants to affirm this value were included.

After completing the celebrity control task, participants were asked their opinion of David Beckham. This rating was found to be weakly correlated with one of the measures, "The questionnaire made me think about things I am good at / bad at", $r(69) = .25$, $p = .036$. None of the other outcome variables were significantly associated with the opinion rating (*r*s ranged from .19 to -.15).

For those completing the values essay control task, the instructions were same as for Study 1 (Chapter 2) with the following exceptions: the study was described as a social perceptions study investigating participants' perceptions of their own values, as

well as the values of people they know and well-known celebrities. They were told that they could be asked questions relating to any of these groups.

Outcome Measures

The outcome measures were intermixed with a variety of filler items. For example, "How easy was it for you to... make judgements about your own strengths / David Beckham's strengths / describe the type of person you wrote about in your statement?" and "I like to read about the lives of other people in magazines and newspapers". All responses were given on 7-point scales (anchored at 0 and 6) unless otherwise stated.

The key measures used to assess the impact of the tasks on positive aspects of the self included the following question and semantic labels: "The questionnaire / writing the statement made me think about..." *negative aspects of myself / positive aspects of myself, things that are not important to me / things that are important to me, things I don't like about myself / things I like about myself, things I am bad at / things I am good at, things I don't value about myself / things I value about myself, my failings / my successes, my weaknesses / my strengths.* The mid-point was labelled *not at all.* In the self-affirmation condition participants also completed the following measure, "Completing the questionnaire made me feel..." *foolish / clever, inadequate / adequate, bad / good, unimportant / important, inferior / superior, unattractive / attractive.* Those in the celebrity control and essay values condition also completed the equivalent items ("Thinking about David Beckham made me feel..." and "Thinking about how my least important value could be important to other people made me feel..."). The mid-point was labelled *not at all.*

Two further items were also included to measure the impact of the task, "The questionnaire / writing the statement made me aware of who I am" and "The questionnaire / writing the statement made me aware of my values (principles and standards by which I try and live my life)." Responses were measured on 5-point scales (*strongly disagree* [0] / *disagree / neutral / agree / strongly agree* [4]).

To investigate whether participants made comparisons with others while completing the tasks they responded to the statement "David Beckham has... *fewer personal strengths than me / more personal strengths than me*", in the celebrity condition, " The average other has... *fewer personal strengths than me / more*

personal strengths than me" in the self-affirmation condition, and "People who hold my least important value have... *fewer personal strengths than me / more personal strengths than me*" in the essay values condition. As a more direct measure of whether participants made comparisons while completing the tasks, they also completed the following question with appropriate response label: "While completing the questionnaire (statement) I compared myself... *unfavourably to David Beckham / favourably to David Beckham, unfavourably to others / favourably to others, unfavourably to someone who holds my least important value / favourably someone who holds my least important value.* The neutral mid-point was labelled *not at all.*

In the final section participants also completed the single item measuring participants' self-regard, "How do you feel about yourself?", the Current Thought Scale (Heatherton & Polivy, 1991) measure of state self-esteem, the measure of current mood (Raghunathan and Trope, 2002), and the Robin et al. (2001) measure of trait self-esteem.

Procedure

Participants were asked to take part in a psychology project examining social perceptions. Participants completed the character strength questionnaires either individually or in groups of between 5 and 10. Participants were told to work through the questions in order and at their own pace, and those in groups were told to do so in silence. Those in the essay values condition all completed the task individually. Participants were given ten minutes to write the statement and then were provided with the outcome measures.

Results

Comparison of control tasks

The data were analysed using one-way ANOVAs, with control condition (celebrity or values essay) as the between-participants variable. Analysis of participants' mood after the tasks revealed no significant differences either in negative mood $F(1, 84) < 1$, or positive mood, $F(1, 84) < 1$. There was also no significant differences in state self-esteem, $F(1, 88) < 1$, or self-regard, $F(1, 87) < 1$, between the two control conditions. The mean responses of both control groups to the outcome measures are in Table 3.6.

Table 3.6. *Mean Responses to Mood, State self-esteem and Self-regard Measures by Control Condition.*

Outcome measure	Celebrity (N = 69)	Value Essay (N = 26)
Positive affect	1.60 (0.87)	1.41 (0.68)
Negative affect	0.62 (0.84)	0.57 (0.66)
State self-esteem	69.18 (9.47)	69.05 (11.31)
Self-regard	3.25 (0.77)	3.14 (0.99)

One-way ANOVAs, with questionnaire condition (celebrity control or values essay control) as the between-participants variable, tested whether the two control tasks significantly differed in their impact on salience of central and positive aspects of the self-concept. The difference in how much the tasks had made participants think about their failings approached significance, $F(1, 93) = 3.55, p = .063$. Those in the celebrity condition reported thinking slightly more about their failings. However, those in the celebrity condition thought less about "who I am" , $F(1, 81) = 17.67, p < .001$, and about their values, $F(1, 80) = 5.08, p = .027$, than those in the value essay condition. The two control conditions did not differ significantly on the rest of the outcome measures (Table 3.7).

One-sample t-tests were conducted to test whether participants' responses differed from neutral. Analysis revealed that responses of those in the essay value condition only differed from the neutral mid-point on the items measuring whether the task made them aware of "who I am" and their values. On these two items those completing the value essay task slightly agreed that they had been made aware of these aspects of themselves. Analysis of those completing the celebrity task revealed significant differences from the neutral mid-point for response on the items measuring how much the questionnaire made them think about negative aspects of the self, things that were important to them, things they value about themselves, their weaknesses, and feeling inadequate and bad. However, all these differences were in a positive direction (i.e., above neutral), suggesting the task had not made them feel worse about themselves. Participants also reported that the celebrity control task had made them slightly aware of their values, contrary to Study 2a.

Table 3.7. *Mean Responses of Self-Concept Salience as a Function of Self-affirmation.*

Outcome measures	Celebrity (N = 69)	Value Essay (N = 26)
The task made me think about:		
Negative / positive aspect of myself	0.26 (1.01)*[a]	-0.04 (1.04)
Things that unimportant / important to me	0.35 (1.27)*	0.46 (1.73)
Things I do not / do like about myself	0.13 (0.98)	0.12 (1.14)
Things I am bad / good at	-0.03 (1.02)	0.04 (1.00)
Things I do not / do value about myself	0.40 (0.87)***	0.38 (1.24)
My failings / successes	-0.04 (0.74)	0.31 (0.97)
My weaknesses / strengths	0.32 (0.94)**	0.19 (1.23)
The task made me feel:		
Foolish / Clever	0.08 (0.94)	-0.04 (0.87)
Inadequate / Adequate	0.36 (0.90)**	0.27 (1.19)
Bad / Good	0.30 (0.81)**	0.31 (1.01)
Unimportant / Important	-0.02 (0.65)	0.04 (0.52)
Inferior / Superior	-0.03 (0.76)	-0.23 (0.86)
Unattractive / Attractive	0.02 (0.68)	-0.08 (0.56)
The task made me aware of:		
Who I am	0.05 (0.92)	0.88 (0.59)***
My values (principles / standards)	0.45 (1.00)**	0.96 (0.82)***

Note. Disagreement with the self-concept salience questions was scored negatively (-2, -1), neutral responses were scored as 0, and agreement received a positive score (+1, +2). [a]One sample t-test against midpoint. * $p < .05$. ** $p < .01$. *** $p < .001$.

Participants' reports of how similar they felt to the target of the task (celebrity or someone holding least important value), revealed a significant effect of control condition, $F(1, 74) = 29.04$, $p < .001$, with participants indicating they felt less similar to the celebrity target (Table 3.8). Analysis using one-sample t-tests revealed a marginally non-significant effect for those in the essay condition, such that they reported having more strengths than their target, $t(25) = 1.77$, $p = .09$, while those in the celebrity strengths control did not differ from the mid-point, $t(47)$ .16, $p = .87$. However, the two groups did not significantly differ in the number of strengths they reported having in comparison to their target, $F(1, 73) = 1.44$, $p = .23$. On the direct measure of whether participants had compared themselves with the target during the task, the responses of those in the values essay condition indicated that they did not

compare themselves. In the celebrity strengths condition, the difference from the mid-point approached significance, indicating that they had compared themselves slightly favourably to the target, $t(68)$ 1.72, $p = .09$. However, overall there was no difference between the two control conditions in terms of whether they had reported comparing themselves with the target, $F(1, 94) < 1$.

Table 3.8. *Mean Responses to Similarity and Comparison Measures by Control Condition.*

Outcome measure	Celebrity (N = 69)	Value Essay (N = 26)
Similar to target	1.02 (1.09)	2.50 (1.21)
More strengths than target	3.02 (0.89)	3.27 (0.78)
Made favourable comparisons	3.17 (0.84)	3.27 (1.25)

Note. Higher scores indicate participants felt more similar to target, perceived themselves to have more strengths than the target and made more favourable comparisons.

Comparison of self-affirmation and celebrity control task.

The data were analysed using one-way ANOVAs, with condition (self-affirmation or celebrity control) as the between-participants variable. As with Study 2a, analysis revealed no significant difference between self-affirmed and non-affirmed participants' positive, $F(1, 67) = 1.09$, $p = .30$, or negative mood, $F(1, 68) = < 1$, after completing the character strength questionnaire (Table 3.9). Neither were there significant effects of self-affirmation condition on state self-esteem, $F(1, 66) < 1$, or self-regard, $F(1, 98) = 1.78$, $p = .19$.

Table 3.9. *Mean Responses to Mood, State self-esteem and Self-regard Measures by Control Condition.*

Outcome measure	Self-affirmation (N = 47)	Celebrity (N = 69)
Positive affect	1.38 (0.87)	1.60 (0.87)
Negative affect	0.71 (0.75)	0.62 (0.84)
State self-esteem	70.12 (11.52)	69.18 (9.47)
Self-regard	3.55 (0.96)	3.25 (0.77)

Comparison of the celebrity control and self-affirmation task using one-way ANOVAs, with condition (self-affirmation or celebrity) as the between-participants variable, confirmed that the self-affirmation task made participants think about more positive aspects of themselves, $F(1,115) = 8.07$, $p = .005$, things that were important to them, $F(1, 115) = 5.83$, $p = .017$, and things that they were good at, $F(1,114) = 4.87$, $p = .029$, compared to those who were non-affirmed (Table 3.10 & Figure 3.4).

Table 3.10. *Mean Responses to Measures of Self-Concept Salience as a Function of Self-affirmation.*

Outcome measures	Self-affirmation (N = 47)	Celebrity (N = 69)
The task made me think about:		
1. Negative / positive aspect of myself	0.94 (1.55)*** [a]	0.26 (1.01)*
2. Things that unimportant / important to me	0.94 (1.31)***	0.35 (1.27)*
3. Things I do not / do like about myself	0.49 (1.28)*	0.13 (0.98)
4. Things I am bad / good at	0.47 (1.40)*	-0.03 (1.02)
5. Things I do not / do value about myself	0.62 (1.19)**	0.40 (0.87)***
6. My failings / successes	0.21 (1.43)	-0.04 (0.74)
7. My weaknesses / strengths	0.47 (1.47)*	0.32 (0.94)**

Note. Disagreement with the self-concept salience questions was scored negatively (-2, -1), neutral responses were scored as 0, and agreement received a positive score (+1, +2). [a]One sample t-test against midpoint. * $p < .05$. ** $p < .01$. *** $p < .001$.

The self-affirmation task also made participants feel more important, $F(1, 105) = 10.56$, $p = .002$, superior, $F(1,105) = 4.78$, $p = .031$, attractive, $F(1,104) = 4.60$, $p = .034$, and made them more aware of their self ("who I am"), $F(1,101) = 21.10$, $p < .001$. The effect of self-affirmation on how much participants thought about things they liked about themselves approached significance, $F(1, 115) = 2.90$, $p = .09$. Self-affirmed participants reported thinking about slightly more things they liked about themselves while competing the task. Self-affirmation did not have a significant effect

on thoughts about the things participants valued about themselves, their failing and successes, their weaknesses and strengths, and feeling foolish, inadequate, bad, or awareness of their values or principles (Table 3.11).

Table 3.11. *Mean Responses to Measures of Self-Evaluation and Self-Concept Salience as a Function of Self-affirmation.*

Outcome measures	Self-affirmation (N = 47)	Celebrity (N = 69)
The task made me feel:		
8. Foolish / Clever	0.35 (0.79)** [a]	0.08 (0.94)
9. Inadequate / Adequate	0.57 (1.03)**	0.36 (0.90)**
10. Bad / Good	0.50 (1.01)**	0.30 (0.81)**
11. Unimportant / Important	0.43 (0.78)***	-0.02 (0.65)
12. Inferior / Superior	0.30 (0.81)*	-0.03 (0.76)
13. Unattractive / Attractive	0.35 (0.90)*	0.02 (0.68)
The task made me aware of:		
Who I am	0.83 (0.74)***	0.05 (0.92)
My values (principles / standards)	0.59 (1.00)***	0.45 (1.00)**

Note. Disagreement with the self-concept salience questions was scored negatively (-2, -1), neutral responses were scored as 0, and agreement received a positive score (+1, +2). [a]One sample t-test against midpoint. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

The data from the self-affirmed group were analysed using one-sample t-tests (Table 3.11 and Figure 3.4). The responses of self-affirmed participants differed from the neutral mid-point on all items, except that measuring whether the task made them think about their failings or successes. The rest of the responses were above neutral, indicating that as with Study 2a, the task had focused their attention on positive and important aspects of themselves.

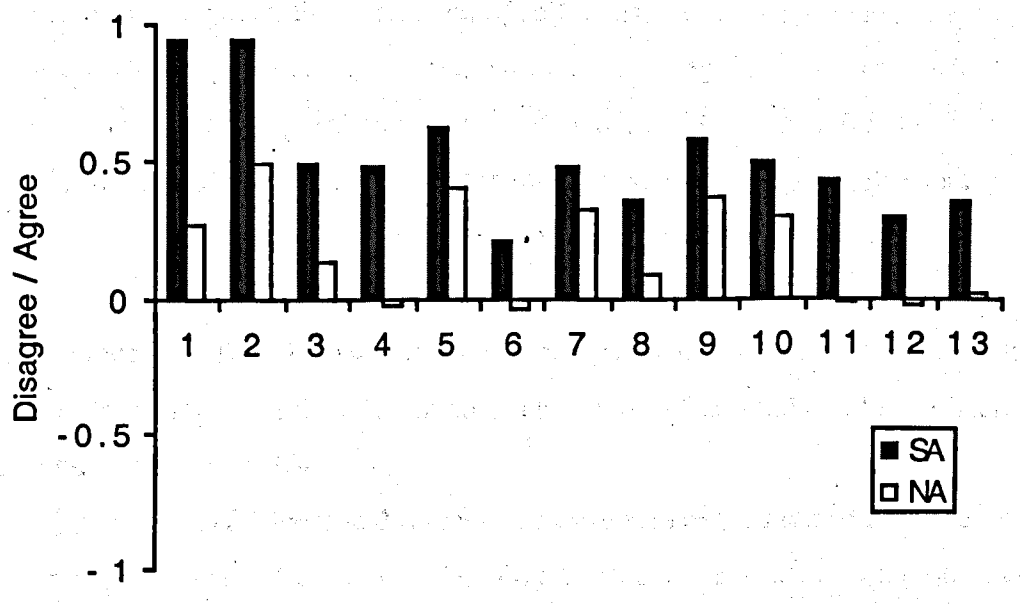

Figure 3.4. Mean responses on measures of salience of positive and central aspects of the self as a function of self-affirmation condition. For item descriptions see Table 3.10 and Table 3.11.

Dispositional self-esteem as a moderator

In an attempt to replicate the findings of Study 2a, moderated regressions were conducted to test whether the effects of self-affirmation on the outcome measures were moderated by dispositional self-esteem. Data were analysed using two-step hierarchical regression analyses. At step one, the main effects of condition (dummy coded 1, 2) and self-esteem were entered, and the Condition X Self-esteem interaction at step two.

Salience of positive and valued self-concepts. The items measuring the impact of questionnaire completion upon salience of central and positive aspects of self-concept were combined into a single item (Cronbach's alpha = .74), as were the items measuring the impact of the questionnaire on how participants felt about themselves (Cronbach's alpha = .78).

Regression analysis revealed that both self-affirmation condition, $\beta = .24$, $p = .007$, and dispositional self-esteem, $\beta = .28$, $p = .002$, predicted salience of positive and central self-concepts. Those who were self-affirmed and also those who had higher

self-esteem reported having thought about more about positive and important aspects of themselves. However, the interaction of self-affirmation condition and dispositional self-esteem was not significant, $\beta = .04$, $p = .64$, indicating that effects of self-affirmation on self-concept salience, were not moderated by dispositional self-esteem. Similarly, the analysis of the impact of the tasks on how participants felt about themselves revealed both self-affirmation condition, $\beta = .23$, $p = .014$, and dispositional self-esteem, $\beta = .31$, $p = .001$, as significant predictors, while the interaction was not, $\beta = .01$, $p = .91$. These findings are consistent with those of Study 2a in demonstrating that self-affirmation did not have differential effects at different levels of dispositional self-esteem.

Positive mood. Moderated regressions were also carried out to examine whether dispositional self-esteem moderated the effects of self-affirmation on mood, self-regard, or state self-esteem. The first analysis, predicting positive mood, revealed only dispositional self-esteem, $\beta = .42$, $p = .001$, and not self-affirmation condition itself, $\beta = -.14$, $p = .24$, or the interaction, $\beta = .03$, $p = .80$, significantly predicted positive mood. Higher levels of dispositional self-esteem were associated with higher levels of positive mood.

Negative mood. A second analysis for negative mood yielded similar results, with dispositional self-esteem significantly predicting negative mood, $\beta = -.30$, $p = .016$, while self-affirmation condition, $\beta = .05$, $p = .65$, and the interaction, $\beta = .11$, $p = .39$, were not significant predictors. Higher levels of dispositional self-esteem were associated with lower levels of negative mood. Unlike Study 2a, the interaction of Condition x Self-esteem did not emerge as a significant predictor for either positive or negative mood.

State self-esteem. The analysis of state-self esteem revealed that, as with Study 2a, dispositional self-esteem, $\beta = .56$, $p < .001$, but neither self-affirmation condition, $\beta = .07$, $p = .52$, nor the interaction, $\beta = .05$, $p = .62$, predicted state self-esteem. Higher levels of dispositional self-esteem were associated with greater state self-esteem.

Self-regard. A final analysis revealed dispositional self-esteem significantly predicted self-regard, $\beta = .60$, $p < .001$, self-affirmation condition approached significance, $\beta = .14$, $p = .055$, while the interaction was not a significant predictor, β

= .10, p = .20. As with Study 2a, self-regard was found to be at its highest in those who were self affirmed and also those with high dispositional self-esteem.

Discussion

The self-affirmation task was found to focus participants' attention on positive and central aspects of their self-concept, and was associated with more positive ratings of how participants felt about themselves, in comparison to the celebrity control task. Self-affirmation did not result in more positive mood, less negative mood, or higher state self-esteem. Moderated regression did suggest self-affirmation led to a marginal increase in self-regard.

Dispositional self-esteem predicted the salience of positive and central aspects of the self-concept and positive ratings of the self. However, self-affirmation led to an increase in these variables regardless of level of self-esteem. Dispositional self-esteem was not found to moderate any of the effects of self-affirmation.

General Discussion

The self-affirmation task was found to focus participants' attention on positive, valued, and central aspects of their self-concept, in comparison to the equivalent control questionnaire, which did not. This process of making salient valued and important aspects of the self-concept is said to be self-affirming (Steele, 1988). The method thus adds to those available a technique that is relatively straightforward to use, and is rooted in contemporary thinking about values (Peterson & Seligman, 2004).

There was no evidence from either Study 2a or 2c that self-affirming resulted in more positive mood, less negative mood, or higher state self-esteem. Thus the effects of self-affirmation were not mediated by changes in these variables. The findings in regard to mood are largely consistent with past research that has demonstrated that self-affirmation does not impact upon explicit mood (Cohen et al., 2000; Lui & Steele, 1986; Sherman et al., 2000), and supports Steele's (1993) model of self-affirmation, which suggests that self-affirmation does not simply bolster positive affect. Past research has also demonstrated that completing a values manipulation, as opposed to positive feedback techniques of self-affirmation, has no impact on state self-esteem (Galinsky et al., 1999; Spencer & Steele, 1990; cited in Fein & Spencer, 1997). This finding was replicated in the current studies. Though

analysis using one-way ANOVAs in both studies 2a and 2c did not provide evidence that the self-affirmation technique increased self-regard, further moderated regressions did reveal the predicted increase in self-regard associated with self-affirmation that has previously been reported by Cohen et al. (2000) and Sherman et al. (2000). As with Cohen et al. (2000), the current findings also suggest that the impact of self-affirmation on self-regard is marginal.

Evidence from the studies reported here suggests that the character strength questionnaire developed can provide a successful method of self-affirmation. However, the current study set out not only to develop an effective self-affirmation technique but also an equivalent control condition. The results of Study 2a indicated that the celebrity condition did not focus participants' attention on valued aspects of their self-concept, and provided an adequate control task. Studies 2b and 2c further supported the adequacy of the technique, demonstrating that the celebrity control is largely comparable to traditional control conditions. In comparison to those completing the essay control, those in the celebrity control condition reported thinking marginally more about their failings; however, their mean response did not significantly differ from neutral. In fact those in the celebrity control reported that the task made them less aware of their own values and who they were, than those in the value essay condition.

Given research demonstrating that people can engage in implicit social comparisons when asked to consider the traits of others (Stapel & Suls, 2004), Study 2b and 2c examined whether the celebrity control had a detrimental effect on participants compared to the more traditional methods. There was no evidence to suggest that the celebrity task caused participants to feel more negatively about themselves. There were no differences on the measure of self-regard between the celebrity control and other controls, and no differences between the celebrity and essay control on the measure of state self-esteem. Furthermore, those in the celebrity control condition reported having the same number of strengths as the celebrity, and even compared themselves marginally favourably with the target. Indeed, in comparison to the traditional value essay control, there was no difference in their reports of making comparisons with the target or the favourability of these comparisons. Finally, the celebrity control condition did not have a negative effect on how participants felt about

themselves. Indeed, participants reported feelings of adequacy and goodness marginally above the neutral mid-point, after completing the control task.

The successful target in the celebrity condition may not have had a negative effect for participants' self-concept because the target was dissimilar and irrelevant to the sample. Participants reported feeling very dissimilar to the celebrity target. Comparison with the value essay technique revealed that participants felt more dissimilar to the celebrity target than a person holding their least important value. As the samples comprised mainly young women, a male sportsman may have been an irrelevant target and any comparisons would have had little impact on the self-concept. Though this technique does appear to provide an adequate self-affirmation and control task within the sample being investigated, caution should be applied when considering using this technique with other groups. For example, for young men aspiring to be successful footballers, another target such as a well-known female celebrity might provide a more suitable target.

Since dispositional self-esteem has been argued to moderate self-affirmation (Steele et al., 1993), with those low in self-esteem being seen as possessing fewer resources on which to self-affirm, the current study set out to investigate dispositional self-esteem as a possible moderator. Dispositional self-esteem was found to influence the salience of positive and central aspects of the self-concept in both Studies 2a and 2c, such that in both the non-affirmed and self-affirmed conditions those with higher self-esteem reported thinking about more positive and central aspects of themselves, than those with lower self-esteem. However, following self-affirmation, an increase in salience of positive and valued self-characteristics (Study 2a and 2c) and feeling positive about the self (Study 2c) were seen regardless of level of self-esteem.

The findings of Study 2a suggest self-affirmation had differential effects on those with high and low self-esteem, boosting the mood of those with low self-esteem and having no impact on the mood of those with moderate and high self-esteem. This finding was not replicated in Study 2c. This could suggest that the self-affirmation manipulation does not affect participants' mood regardless of self-esteem. Alternatively, differences between the findings of Study 2a and 2c could have resulted from differences in the order in which the items were completed. Unlike Study 2a, in which participants only completed the state self-esteem or the current mood measure,

those in Study 2c completed both scales. Furthermore, the current mood measure was placed at the end of the questionnaire, after the state self-esteem scale. By this stage any impact of the questionnaires on mood may have been negated.

Taking together the results from across the outcome variables, there is evidence (contrary to Steele et al., 1993) that those with low self-esteem may have as much to gain from completing a self-affirmation manipulation as those with high self-esteem. This finding is in line with Spencer et al. (2001) who suggest that those with low self-esteem may have difficulty spontaneously engaging in self-affirmation following a self-threat, but may adequately engage in these processes following a values salience self-affirmation task.

Whether all self-affirmation techniques may have benefits for those with low self-esteem, or whether this is specific to techniques involving consideration of personal strengths, remains an empirical question. Past research examining reflection on strengths (Sia, Czuchry, & Dansereau, 1999) has demonstrated that the selection, rather than the generation, of personal strengths may provide a non-threatening task for those with low self-esteem. During such a task those with low self-esteem may attempt to self-enhance, and compared to those with high self-esteem, may find the task even more beneficial. As with the present study, this may suggest that in some contexts those with low self-esteem may experience equal benefit from self-affirmation manipulations. Further research may shed light on when self-esteem moderates the effectiveness of self-affirmation techniques. For example, using techniques that are perceived as either daunting to complete, such as having to generate your own personal strengths, or less credible, for example receiving non-customised positive personality feedback, may have differential effects for those with high and low self-esteem. Thus the effectiveness of a chosen technique may in part depend on the self-esteem of the sample.

The finding that self-affirmation does not appear to act by simply bolstering, for example, state self-esteem or mood, prior to an unexpected threat, does not rule out the possibility that these processes may mediate or initiate self-affirmation in response to a self-threat. For example, people may only naturally self-affirm after experiencing changes in affect, possibly implicitly (Tesser et al., 2000). Self-affirmation manipulations themselves may simply act to make accessible positive and central

aspects of the self-concept that, once made salient, can be drawn upon when self-threats are faced. For instance self-affirmation does not boost perceptions of positive mood or state self-esteem when a threat is not present. But if a threat is encountered, then self-resources made salient by a self-affirmation task can be employed to deal with a self-threat and restore self-esteem or positive mood.

The current studies have provided evidence that the character strength questionnaire used here provides an effective means of self-affirmation, especially useful in settings in which pre-testing of participants' values and assignment to different value conditions may be problematic. However, there may be some possible limitations to the self-affirmation task. Firstly, the values covered in the strengths task may not be exhaustive of those people hold. Though the technique is based on contemporary research examining people values, the authors themselves acknowledge that the study of values is ongoing (Peterson & Seligman, 2004). Further research into participants' values may lead to changes in the current self-affirmation technique. Secondly, though using a technique that can be applied to all participants without pre-testing has practical benefits, it is possible that by focusing on a range of strengths, some self-descriptive and others not, the effects of the self-affirmation task may have been diluted. For example, participants may have received an opportunity to affirm their values, but also have been reminded of areas in which they do not hold strengths. However, results from the studies reported here do suggest overall that participants found the task focused their attention on positive aspects of the self. Furthermore, Tesser (2000) argues that self-affirmation can equally involve focusing on what you are not, as well as who you are. The present task does provide participants with an opportunity to focus on their central values and who they were, a task that could be used to restore self-integrity when faced with threats to their self-conceptions.

Based of the findings of the present studies, the character strength questionnaire was employed in Studies 3 and 4. The use of the character strength questionnaire provides a practical technique of self-affirmation. This proved particularly useful for Study 4, which is an Internet-based study, which required a self-affirmation technique that was relatively quick to complete and did not require pre-testing.

CHAPTER 4: ORIENTATION AND ATTENTION TO NEGATIVE HEALTH INFORMATION

Models of defensive processing suggest that there are multiple ways in which biased processing can occur (Blumberg, 2000; Chaiken et al., 1996; Erdelyi, 1974). For instance, biased processing is associated with the avoidance of processing relevant health information, denial of the threat, denial of implications of the threat, and minimisation of the implications of the threat (Blumberg, 2000). To illustrate this point when encountering a relevant health message outlining the link between FBD and caffeine a person could avoid paying attention to the message, read the message but deny the link between FBD and caffeine, accept the link between FBD and caffeine but deny its personal relevance, or accept personal risk of FBD from caffeine consumption but downplay the seriousness of the disease. Study 1 provided evidence that self-affirmation can promote personal acceptance of a relevant health message. The current study set out to test whether self-affirmation can reduce biased processing at other levels of processing by examining the impact of self-affirmation on attentional avoidance. In addition, the current study was intended to examine the effects of self-affirmation on depth of processing applied to a health message, and whether the effects of self-affirmation are detectable in the accessibility of thoughts associated with defensive and accurate processing.

General acceptance of a threat

Of the few studies that have attempted to test what effects self-affirmation may have on participants' processing of threatening or preference-inconsistent information, findings have indicated self-affirmation may have the potential to reduce defensiveness at various levels of information processing. Firstly, self-affirmation has been found to increase participants' message acceptance on general measures of acceptance (Cohen et al., 2000; Sherman et al., 2000). For example, Sherman et al. (2000) found that, in comparison to non-affirmed participants, self-affirmed coffee drinkers reported greater belief that there was a link between FBD and caffeine, and believed it more important for women to reduce their caffeine consumption after reading a message outlining the risks of caffeine. Reed and Aspinwall (1998) also

found that self-affirmed participants reported being more convinced by relevant health-risk information, than those who were non-affirmed.

Cohen, Aronson, and Steele (2000) examined the impact of self-affirmation on the processing of messages incongruent with participants' prior beliefs, such as those on capital punishment or abortion. Self-affirmed participants reported more favourable evaluations of attitude-incongruent information, and found it marginally more convincing, than those who were non-affirmed. Cohen et al., also demonstrated that self-affirmation could reduce biased evaluation of attitude-congruent information, as opposed to attitude-incongruent information. Self-affirmed participants were found to rate an advocate presenting attitude-congruent information less favourably than those who were non-affirmed, thus suggesting that self-affirmed participants did not mindlessly accept information congruent with their prior beliefs, but that self-affirmation promoted less biased processing and evaluation of attitude-congruent information.

Attentional avoidance

Biased processing can take the form of attentional avoidance (Blumberg, 2000; Chaiken et al., 1996). Chaiken et al. claim that, to maintain positive self-conceptions, people can avoid attending to information that may threaten the self. Attentional avoidance can take the form of cognitive or behavioural distractions (Blumberg, 2000). For example, a person can either pay less attention to a message incongruent with their beliefs or, if given a choice of information read, non-threatening, as opposed to threatening information (Chaiken et al., 1996). Reed and Aspinwall (1998) provide a test of self-affirmation's ability to influence biased processing at the level of attentional avoidance. In their study participants were provided with the choice of reading three different pieces of information about caffeine and fibrocystic disease (FBD), including neutral, risk-confirming and risk-disconfirming evidence. Participants were able to read as many of the pieces of information as they wanted and in any order. Reed and Aspinwall found that participants who were self-affirmed appeared to orientate more quickly to the risk-confirming information. That is, self-affirmed participants chose to read the risk-confirming information earlier than

participants who were non-affirmed. Thus, self-affirmation appeared to be able to reduce attentional avoidance. However, this finding clearly needs replicating.

Recall of threat

Another level of information processing at which defensiveness can occur is at recall of information. Croyle, Sun and Hart (1997) examined participants' recall of a cholesterol test result after either one, three or six months. Participants were asked to recall both their cholesterol level and their risk category (i.e., if their result indicated they were at high risk, borderline risk or was desirable). Most participants were fairly accurate in their recall, especially of their risk category. Examining the recall errors they did make, however, revealed that, when people were inaccurate it tended to be a result of recalling their test result to be more rather than less desirable. Consistent with a defensive hypothesis the tendency to misremember risk information to be more favourable was most prominent in those who had received the most negative test results; thus those for whom the health information was potentially most threatening displayed the greatest bias in recall (Croyle et al., 1997).

To test whether self-affirmation affects participants' recall of a health message, Reed and Aspinwall (1998) measured recall of information about the risk of caffeine after one week. Their findings indicated that self-affirmed participants recalled less of the risk-disconfirming evidence than those who were non-affirmed. This finding may reflect a reduction in defensive recall, with non-affirmed participants focusing more on information congruent with a defensive goal, i.e., information that enabled them to dismiss the threat. However, one weakness of Reed and Aspinwall's study was that participants differed in the order in which the information was presented, and participants did not necessarily read all three pieces of risk-confirming, risk-disconfirming or neutral information. These factors could influence participants' subsequent recall (Atkinson & Shiffrin, 1968).

Study 1 also examined whether self-affirmation affected recall of information, testing whether self-affirmed participants were more accurate in their recall of facts presented in the threatening health leaflet, both immediately after reading it and one week later. The results indicated that higher risk, self-affirmed and non-affirmed women did not differ in their recall of information central to the leaflet's claims about

alcohol and breast cancer. However, on the item measuring recall of information peripheral to the message, regarding the risks of smoking cigarettes, self-affirmed participants incorrectly agreed more that smoking increased the risk of breast cancer. One possible explanation for this finding is that self-affirmed participants either paid less attention to aspects of the leaflet not specifically relevant to them or alternatively, less attention to the message as a whole. If this were the case this may suggest self-affirmed participants processed the message less systematically.

One of the limitations of Study 1 is that it is unclear whether self-affirmation promoted message acceptance through systematic or heuristic processing of the message (Chaiken et al., 1996). If self-affirmed participants did not engage in systematic processing of the information, this could have two important implications. Firstly, any changes in attitudes or beliefs might be short-lived and vulnerable to change because participants did not carefully consider the information. Secondly, if self-affirmation is associated with less in-depth processing of a health threat, this would challenge Steele's claims about the effects of self-affirmation. Rather than self-affirmation providing a source for self-objectivity and enabling participants to face up to a threat to the self, it would suggest that self-affirmation might promote a mindset of "agreeableness". In other words, self-affirmed participants might accept a message, but not through thoughtful consideration of the evidence, but mindlessly. Further tests are needed, both to establish whether self-affirmation may affect the depth of processing applied to a message, and recall of threatening health information.

Indirect measures of defensiveness

Previous studies examining the effects of self-affirmation on the processing of health threats and self-threats in general have commonly relied on direct or explicit measures to assess whether self-affirmation reduces the motivation to engage processes to restore self-integrity. For example, past studies have measured the impact of self-affirmation on measures of message acceptance or attitude change (Cohen et al., 2000; Reed & Aspinwall, 1998; Sherman et al., 2000). Demonstrating that self-affirmed participants evaluate an attitude-incongruent message less harshly, report less attitude change after a dissonance task, or accept a threatening health message more readily, are all indicative of self-affirmation restoring self-integrity and reducing biased responses to threat. Currently, there is little research examining the effects of

self-affirmation following threat using indirect or implicit measures. The use of implicit measures offers a useful additional method of measuring defensive responding to health information, providing an estimate of biased information processing without relying on self-reports that can be subject to response biases, such as demand characteristics (Fazio & Olson, 2003).

In one study that has included indirect measures, Koole, Smeet, Van Knippenberg, and Dijksterhuis (1999) examined the effects of self-affirmation on a lexical decision task after failing an IQ test. Rather than examining defensive responses to the test, Koole et al. examined cessation of rumination. That is to what extent participants continued to think about their failure after completing the test. Participants were presented with words related or unrelated to the IQ test, and asked to judge whether words presented were words or non-words. Koole et al. hypothesised, based on the literature on the accessibility of goals (Dijksterhuis & van Knippenberg, 1996; Neely, 1977), that if participants continued to ruminate over their failure, they would respond faster to words related to the test, rather than those unrelated to it. However, for self-affirmed participants, who had been offered an opportunity to resolve the threat to their self-integrity, rumination should cease, and thus there would be no differences in reaction times for words related or unrelated to the IQ test. This hypothesis was supported, providing evidence on an implicit task that self-affirmation can influence cognitions associated with failure following threat.

The literature examining the accessibility of attitudes, goals and motives (for example, Bargh, 1990; Fazio & Towles-Schwen, 1999; Sanna, Chang, & Meier, 2001) also suggests that participants' reaction times to agree or disagree with statements reflecting motivation to be defensive or accurate in processing a health message could provide an index of how accessible these motives are. For example, Roese and Olson (1997) demonstrated that, after failure, participants were faster to respond to counterfactuals, such as "my score could have been higher" than after success. Shorter latencies of response are argued to be indicative of stronger activation of the counterfactuals.

Using indirect measures to assess the effects of self-affirmation provides an additional method to complement more questionnaire-based measures, and help provide converging evidence that self-affirmation can reduce defensiveness in

response to a threat. If self-affirmation directly reduces the motivation to engage in strategies such as denial, counter-arguing or minimisation of the threat, then thoughts relating to these defensive strategies should be less accessible following a threat.

The Current Study

Participants in the present study were presented with a message detailing the risks of Fibrocystic Disease and breast cancer associated with drinking caffeine, a message previously used in research examining both defensive processing of health messages (Kunda, 1986; Liberman & Chaiken, 1992) and the effects of self-affirmation (Reed & Aspinwall, 1998; Sherman et al., 2000). Study 3 provides an additional test of the findings of Study 1, and included cognitive and affective measures of message acceptance both immediately after the health message was presented, and after one week. In addition, the present study also sought to test participants' orientation to threat, recall of the message, depth of processing, and the accessibility of thoughts associated with defensive strategies, such as denial, counter-arguing or minimisation.

Firstly, to test participants' orientation to threat, the current study used a different measure of orientation to that of Reed and Aspinwall (1998). Their measure of time to orientate was confounded by how long participants spent reading information prior to choosing the threatening information, i.e., both self-affirmed and non-affirmed participants may have chosen to read the risk-disconfirming evidence, but self-affirmed participants may have spent less time reading it, and thus chose to read the risk-confirming evidence earlier. Indeed the results do suggest that non-affirmed participants spent longer reading the risk-disconfirming information. Further research is needed to establish whether self-affirmation does reduce attentional avoidance of threat. In the present study, participants were offered a choice of two articles to read. The titles suggested that participants would either be presented with a neutral health article, or a more threatening and personally-relevant message. (However, irrespective of their choice of title participants were presented with the same article.) This method has the benefit of overcoming the problem in Reed and Aspinwall's method. If self-affirmation acts to reduce biased processing at the level of attentional avoidance, participants given an opportunity to affirm important self-

aspects should be more likely to choose the article apparently presenting more threatening and relevant health information, than will those who are non-affirmed.

To control for the possible effects of trait anxiety on orientation to threat the current study also included a measure of general anxiety. Research examining the effects of trait anxiety on orientation to threat, and specifically visual selective attention, suggests that those with high anxiety orient towards negative stimuli more than those with low anxiety (Mogg & Bradley, 1998, 1999; Williams, Watts, MacLeod, & Matthews, 1988, 1997). Spielberger, Gorsuch, and Lushene's (1970) measure of trait anxiety was included to ensure self-affirmed and non-affirmed participants did not differ on this variable, and to test whether trait anxiety moderated the effects of self-affirmation on orientation to threat.

Secondly, the present study included a measure of participants' recall of the health information after one week. This acted both as a measure of depth of processing, such that recalling more information is indicative of greater depth of processing (Petty & Cacioppo, 1986), and to examine any biases in participants' recall of information. If non-affirmed participants were more defensive, they may recall more of the risk-disconfirming evidence, or be less accurate in their recall of risk-confirming information. In addition, by presenting all participants with the same message, in the same order, the current study's measure of recall has some benefits over that of Reed and Aspinwall (1998).

As further tests of depth of processing applied to a threatening health message, the time participants spent reading the message was recorded, as well as measures of self reports of depth of processing and participants' accuracy of recalling of words presented in the message immediately after reading the message.

Thirdly, the present study aimed to test the accessibility of statements that could reflect denial or minimisation of the threat. Based on the literature examining the accessibility of goals and motives (Koole et al., 1999, Roese & Olson, 1997; Sanna et al., 2001) it was hypothesised that participants would be faster to respond to statements that were congruent with their current motive and activated attitudes. For example, a participant denying personal inferences would be faster than a non-biased participant

to agree with a statement such as "I do not drink as much caffeine as other women" (i.e., a statement reflecting denial of personal relevance). Thus in the present study, participants were presented with statements associated with both defensive (denial of relevance, counter-arguing, and minimisation) and accuracy goals.

Finally, measures of self-esteem and mood were also included. Though the findings of Studies 1 and 2 suggest that self-esteem does not moderate the effects of self-affirmation, including this measure would allow a further test of this finding using the character strength self-affirmation techniques in conjunction with a self-threat. Measures of mood, pre- and post-manipulation were included to test whether changes in mood mediated the effects of self-affirmation.

Study 3

Method

Participants and Design

Undergraduate females ($N = 51$) were recruited to take part in the experiment in return for course credit or payment. Participants were selected on the basis of their responses to a preliminary questionnaire measuring a variety of health-related behaviours taken at the beginning of the academic year. All participants who were recruited reported drinking more than 2 caffeinated drinks on a daily basis. Participants were randomly assigned to affirmation condition, to which the experimenter was blind. Key dependent variables were measured immediately and also after 1 week.

Materials

Pre-manipulation measures (Questionnaire 1). The preliminary questionnaire was entitled a "Lifestyle Questionnaire" and contained questions about smoking, caffeine consumption and current mood. The smoking items helped camouflage the true goals of the study. Participants reported whether they smoked or not (*Yes / No*), and if so how many cigarettes they smoked on average each day. Caffeine consumption was measured using 2 items: "How many caffeinated drinks (e.g., tea, coffee, cola, Red Bull) have you consumed in the last 24 hours?", and "In a typical day I drink approximately _____ caffeinated drinks".

Participants completed the measure of current mood (Raghunathan & Trope, 2002) described in Chapter 3. Participants were presented with 8 adjectives, two measuring positive mood (happy / elated), two items for negative mood (sad /

depressed), and four filler items. Participants were instructed to indicate to what extent each adjective described how they currently felt, indicating their position on a four point scale (*Definitely does not apply to my feeling at this moment* [0] / *definitely does apply to my feeling at the moment* [3]).

Self-affirmation manipulation. Participants completed the character strength questionnaire (personal values or David Beckham's values) as described in more detail in Chapter 3. This task was presented as a questionnaire the experimenter was handing out on behalf of her supervisor.

Health article. Using PsyScope software on an Apple Macintosh Computer, participants were presented with two titles of FBD-related articles (neutral title, "What is FBD?"; more threatening title, "Understanding my personal risk of FBD"). Participants responded by choosing the article that they wanted to read by pressing either "p" or "q" on the computer keyboard. The order in which the article titles appeared, and their keyboard button response, were counter-balanced across conditions and handedness. The article (Appendix E) was presented under 7 separate subheadings: "What is FBD?", "Who is affected?", "Is it serious?", "What is known?", "What should I do?", "How strong is the evidence for the link between caffeine and FBD?", and "Recommendations". The article described Fibrocystic Disease, its effects and possible risk factors, and suggested that there was evidence that caffeine consumption was linked to FBD, and that FBD could increase the risk of breast cancer. The article concluded by recommending that women should consume no more than 2 caffeinated drinks per day.

Word recall task. Participants were instructed to recall as quickly and accurately as possible whether presented words had appeared in the article. They were told to "think about whether each word appeared in the article you have just read. Please be as accurate as possible. We want to know if the EXACT word appeared in the article, not words with similar meaning or appearance." Responses were made by pressing 'z' or 'm' on the computer keyboard. The labels of agree and disagree were counterbalanced, such that for half the participants 'z' corresponded to 'agree', and for the other half 'm' corresponded to 'agree'. This was counterbalanced not only across conditions but also handedness.

After responding to two practice words, participants were presented with neutral and threat-related words that either did or did not appear in the article. The words were presented in a random order (Table 4.1). All words were matched across the 4 word sets (novel/threatening; non-novel/threatening; novel/neutral; non-novel/neutral) for word length, number of syllables, and frequency in the English language using the norms in Francis and Kucera (1982). The words were also piloted for emotional valence to ensure that there were no significant differences on this variable between the non-novel and novel stimuli. (In a pilot study, female undergraduates ($N = 45$) were provided with information about FBD, and were asked to imagine having read information describing a link between FBD, breast cancer and caffeine. Participants then rated a pool of 60 words for their emotional valence, from which the final word groups were selected.)

The final word groups were analysed using two-way ANOVAs, with between-groups variables of valence (neutral or threatening) and whether the word was presented in the article (in or out). The threat and non-threat words did not differ in terms of word length, $F(1,19) = 1.60$, $p = .22$, number of syllables, $F(1,19) < 1$, or word frequency, $F(1,19) < 1$. Nor did the words that were or were not presented in the message differ with respect to word length, $F(1,19) < 1$, number of syllables, $F(1,19) < 1$, or word frequency, $F(1,19) < 1$. Analysis of participants' ratings of the emotional valence of the words revealed the predicted main effect of valence, $F(1,19) = 154.57$, $p < .001$. Participants rated the threatening words as more threatening than the neutral words. The main effect of presentation was not significant, $F(1,19) < 1$, indicating that emotional valence did not differ between those words that were and were not presented. Examination of the interaction terms of Valence X Presentation on the various dependent variables revealed that the word groups did not differ with regards to word length, $F(1,19) < 1$, number of syllables, $F(1,19) < 1$, or word frequency, $F(1,19) < 1$.

Table 4.1. *List of Neutral and Threatening Words by Presentation and Word Group Characteristics.*

	Neutral In	Threatening In	Neutral Out	Threatening Out
Word lists	Cycle	Painful	Observe	Terror
	Yearly	Swelling	Eaten	Fatigue
	Linear	Illness	Border	Helpless
	Match	Growth	Write	Guilt
	Measurable	Susceptible	Periphery	Coronary
Word length	6.40 (1.91)	8.00 (2.35)	6.40 (1.67)	7.00 (1.58)
Syllables	2.60 (0.89)	2.40 (0.89)	2.40 (0.89)	2.40 (0.89)
Word frequency	21.00 (14.04)	39.40 (54.56)	33.80 (41.06)	19.60 (10.33)
Threat	3.11 (0.14)	0.97 (0.41)	3.00 (0.16)	1.01 (0.58)

Note. Standard deviation in parenthesis (applies throughout this chapter).

Each word was presented in the center of the screen, and remained on the screen until participants made a response. There was a two second delay between each word presentation, during which the screen was blank.

Statement task. Participants were presented with 23 statements (Table 4.2) and some filler statements (e.g., "I did not like reading the information"). Agreement or disagreement with each statement was indicated by pressing 'z' or 'm' on the computer keyboard, and response labels were counterbalanced. Participants were instructed to respond as quickly and accurately as possible to each statement.

Statements were primarily generated from pilot work, in which 45 female participants completed a thought-listing task, while reading a relevant health message (alcohol and breast cancer message). Based on the literature examining biased processing of health information (Blumberg, 2000; Chaiken et al., 1996; Raghunathan & Trope, 2002) two independent judges categorised participants' thought-listings into statements counter-arguing the message, minimising the message, denying personal relevance of the message and those suggesting participants took the message seriously. The two judges' ratings were significantly correlated between $r(45) = .72$, $p < .001$ and $r(45) = .94$, $p < .001$. These categories and participants' thought listings were used to generate the statements used in the present study. Appendix F presents

examples of thought listings to illustrate how statements in the present study were developed.

In total, seven statements reflecting minimisation of threat were selected and five statements suggesting that the article was considered serious and genuine. A further three statements measured thoughts reflecting counter-arguing of the information, and five statements measured denial of personal relevance of the article. Participants also responded to three statements measuring depth of processing.

Table 4.2. *Statements Presented and Associated Motive.*

Statement	Associated motive
Drinking caffeine is ok in moderation	Minimisation
You can not worry about all the things that are meant to be bad for you	Minimisation
You can not avoid every behaviour that might be risky	Minimisation
Other factors influence the development of breast cancer	Minimisation
Many factors are likely to impact your risk of FBD	Minimisation
Many factors are likely to impact your risk of breast cancer	Minimisation
FBD is not a serious illness condition	Minimisation
Drinking caffeine increases the risk of developing breast cancer	Serious / Genuine
Drinking caffeine increases the risk of FBD	Serious / Genuine
The article provided valuable information	Serious / Genuine
The article provided useful information	Serious / Genuine
The information provided will help improve my health	Serious / Genuine
The information was unreliable	Counter-arguing
The information source was not reliable	Counter-arguing
Drinking caffeine has benefits	Counter-arguing
I do not drink as much caffeine as other women	Denial relevance
FBD is not something I need to worry about at my age	Denial relevance
Other women drink more caffeine than me	Denial relevance
The content of the article was relevant to me[a]	Denial relevance
Breast cancer is not something I need to worry about at my age	Denial relevance
While reading the article I thought deeply about the information	Thought deeply
While reading the article I thought deeply about my risk of breast cancer	Thought deeply
While reading the article I thought deeply about my risk of FBD	Thought deeply

Note. [a] This item was later recoded to reflect denial of personal relevance.

As with the word recall task, each statement was presented in the center of the screen, and remained on the screen until participants made a response. There was a

two second delay between each statement presentation, during which the screen was blank.

Post-manipulation measures (Questionnaire 2). Written instructions asked participants to complete questions relating to their reactions to the health article. They were encouraged to answer the questions "as honestly and accurately" as possible. The first section contained items measuring perceptions of risk and severity. Participants were asked: "How likely do you think YOU will be to experience FBD from your past caffeine consumption?", followed by the equivalent item for the average student, "How likely do you think *the average Sheffield University student of your age and sex* will be to experience FBD from their past caffeine consumption?". These two items were repeated for risk of breast cancer. Responses were given on an 11-point scale, *impossible* (0) to *extremely likely* (10). Two items measured perceptions of severity, "In your opinion, how serious (severe) a health disorder is FBD / breast cancer?", responses were given on a 11-point scale, *not serious* (0) to *very serious* (10).

Next followed items measuring: *beliefs*, "I believe that drinking caffeine increases the chances of people developing FBD", "I believe that drinking caffeine increases the chances of people developing breast cancer" (*Strongly disagree* [0] / *Strongly agree* [6]); *worry*, "I feel my level of caffeine consumption is something I..." (*don't need to worry about* [0] / *do need to worry about* [6]), "I feel worried about the possible effects of drinking caffeine." (*Not at all worried* [0] / *Extremely worried* [6], two items combined into single item, $r(51) = .69, p < .001$); ratings of *evidence strength*, "The evidence linking caffeine and FBD / breast cancer is weak" (2 items: *Strongly disagree* [0] / *Strongly agree* [6]); and an *intention* item, "I intend to cut down on the amount of caffeine I drink in a typical day" (*Definitely do not intend to* [0] / *Definitely intend to* [6]). All items were measured on 7-point scales.

Participants then completed 5 items measuring their response while reading the article, for example, "I thought about my risk of breast cancer" and "I tried not to think about how the information applied to me". Responses were given on a 7-point scale, *Not at all* (0) to *Very much* (6).

The final section contained the following items in sequence: two *perceived relevance* items, "The content was relevant to me / relevant to the average University student of your age and sex" (7-point scale, *Strongly disagree* [0] / *Strongly agree* [6]),

an *impact* item, "I will probably forget about the article within a couple of days" (7-point scale, *Strongly disagree* [0] / *Strongly agree* [6]), and two *ease of imagination* items, "How easy is it for you to imagine yourself experiencing FBD as a result of your past caffeine consumption", and the same item as a result of breast cancer. The ease of imagination items were measured on a 6-point scale, *not at all easy* (0), *slightly easy*, *quite easy*, *moderately easy*, *very easy*, *extremely easy* (5). Participants then completed a second *intentions* item, "I intend to cut down on the amount of caffeine I drink in the next 7 days" and an *expectation* item, "I expect to cut down on the amount of caffeine I drink in the next 7 days'. The two intention items, separated by 12 items, were significantly correlated and combined into a single item, $r(51) = .82, p < .001$. Finally, participants completed the same measure of current mood as in the pre-manipulation questionnaire.

One-week follow-up. After one week, participants returned to complete a surprise recall task. Participants were asked to write down as many details as possible about the article they read the previous week, aiming to fill a minimum of a sheet of paper. Then they completed the dependent measures as per the previous week, including measures of reported *caffeine consumption* over the previous week and last 24 hours, perceptions of *risk* (both self and other), *severity*, *belief*, *worry*, *intentions*, *ease of imagination*, and *relevance*. Participants also responded to the following statements: "Since reading the article about FBD last week, which of the following have applied to you?... I have thought about the amount of caffeine that I drink, I have thought about my risk of developing breast cancer, I have worried about the amount of caffeine I drink, I have thought deeply about the information, I have tried not to think about how the article applied to me, I have talked to friends about the FBD article, I have researched information about FBD (for example using the Internet)". Responses were given on 7-point scales (*Not at all* [0] to *Very much* [6]).

Finally, participants completed the trait anxiety component of the State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, & Lushene, 1970). The STAI consists of twenty items designed to assess trait anxiety (e.g., "I feel nervous and restless', "I feel difficulties piling up that I cannot overcome"). Participants indicated their agreement with each statement on a four-point scale (*not at all* [1] to *very much so*

[4]). Positively worded items were recoded and the items summed to provide a total score, with higher scores indicating higher levels of trait anxiety.

Procedure

Participants were recruited to take part in a study examining reactions to health information, and were tested individually. Participants were instructed that they would be taking part in a study to evaluate health information and would be asked to choose one of two health-related articles to read. After completing the preliminary questions (Questionnaire 1) participants were asked whether, while waiting for the experimenter to ostensibly finish setting up the computer-based task, they would be willing to complete a questionnaire (the self-affirmation manipulation or control task) on behalf of the experimenter's supervisor. All agreed. The experimenter set up the computer while participants read through the instruction information for the affirmation / control task, and then left the room while they completed the manipulation itself.

After completing the self-affirmation / control task, participants were seated in front of the computer, and were asked to work through the tasks presented on the screen. The experimenter left the room while participants read the article, and completed the word recall and statement response task. Following this, the experimenter provided participants with a copy of the final questionnaire.

Before they left, the experimenter reviewed participants' responses to the final questionnaire. If participants reported being overly anxious in response to the article they were debriefed about the nature of the study immediately, and were not asked to return the following week to complete a follow-up. Those who were asked to return were not given any details about what the follow-up would involve, but were simply asked to return to complete the second part of the study. Those who did return the following week completed the surprise recall task, followed by the questionnaire. Participants were then asked to complete the measure of general anxiety. Finally, participants were debriefed about the nature of the study, and reassured about the risks of FBD and breast cancer.

Results

Preliminary Measures

Participants' reports of caffeine consumption on a typical day and the previous day were significantly correlated, $r(50) = .65$, $p < .001$, and combined into a single

item. Self-affirmed and non-affirmed participants did not differ in their reports of past caffeine consumption, $F(1, 50) < 1, p = .69$ (Table 4.3). Examination of participants' mood prior to the self-affirmation manipulation also revealed no significant differences between condition for positive, or negative mood. Self-affirmed and non-affirmed participants did not differ in their level of reported trait anxiety or self-esteem.

Table 4.3. *Mean Responses to Randomisation Check Measures.*

	SA ($n = 26$)	NA ($n = 25$)	F (1, 50)	p
Prior caffeine consumption	4.05 (1.56)	3.86 (1.78)	0.16	.69
Positive mood	1.40 (0.57)	1.50 (0,48)	0.43	.52
Negative mood	0.44 (0.62)	0.24 (0.48)	1.68	.20
Self-esteem	2.77 (1.14)	2.88 (1.09)	0.13	.73
General anxiety	42.43 (9.29)	41.79 (11.59)	0.04	.85

Note. Higher scores indicate higher levels of positive and negative mood, self-esteem, trait anxiety and caffeine consumption. SA = self-affirmation; NA = non-affirmed (applies throughout this chapter).

One-way ANCOVAs were performed to examine whether self-affirmation acted to boost positive mood or reduce negative mood, with condition as a between participants variable and pre-manipulation mood as a covariate. Analysis of positive mood, revealed only mood prior to the manipulation, $F(1, 50) = 36.38, p < .001$, and not condition predicted positive mood, $F(1, 50) < 1$. Similarly, negative mood pre-manipulation predicted negative mood afterwards, $F(1, 50) = 51.35, p < .001$, but condition did not, $F(1, 50) < 1$.

Reaction time data

Data from non-affirmed and self-affirmed participants were screened separately, and where participants' responses fell more than three standard deviations below or above the mean, their response was changed to be one unit (millisecond) higher or lower than the next most extreme value (Tabachnick & Fidell, 1983).

Orientation and reading time

The orientation and reading time data are presented in Table 4.4. Self-affirmed participants were more likely to choose to read the more threateningly titled article

than those who were non-affirmed, $F(1, 50) = 4.84$, $p = .033$. Hierarchical regression analyses were conducted. At step 1 main effects of condition and anxiety were entered, and at step 2 the Condition X Anxiety interaction. The analysis revealed that general anxiety did not predict article choice, ß = -.23, $p = .14$, or moderate the effects of self-affirmation, ß = -.02, $p = .88$.

A two-way between-participants ANOVA, with condition (self-affirmed or non-affirmed) and article choice (threatening or neutral) as independent variables revealed only response choice, $F(1, 50) = 17.28$, $p < .001$, and not condition, $F(1, 50) < 1$, or Condition X Choice, $F(1, 50) < 1$, predicted time taken to choose an article. People were quicker to choose the more threateningly titled article than the neutral article. Self-affirmed and non-affirmed participants did not differ in the amount of time they spent reading the article (Table 4.4).

Table 4.4. *Choice of Article and Reading Time by Condition.*

	SA ($n = 26$)	NA ($n = 25$)	F (1, 50)	p
Participants choosing threatening article[a]	15	7	4.84	.033
Time to choose article	12.8 (2.7)	14.2 (4.1)	2.00	.16
Total reading time	128.2 (29.4)	125.4 (24.0)	0.14	.71

Note. [a]Number of participants. Reading time and orientation speed reported in seconds.

Recall of words

The accuracy and latency of participants' judgements of whether words were presented in the message were analysed using three-way ANOVAs for mixed designs, with condition as between participants variable, and valence of word (neutral or threatening), and whether the word was presented in the article (in or out), as within participants variables. Analysis of data for accuracy of participants' recall (Figure 4.1) revealed significant main effects of threat, $F(1, 50) = 126.89$, $p < .001$, and presentation, $F(1, 50) = 148.83$, $p < .001$, and a Threat X Presentation interaction, $F(1, 50) = 21.39$, $p < .001$. Participants were more accurate in the judgements of threatening words and words that were presented in the article. The analysis also revealed a significant interaction of Condition x Presentation, $F(1, 50) = 5.55$, $p =$

.023. Self-affirmed participants were marginally more accurate at identifying words that were presented in the text, $F(1, 50) = 3.55$, $p = .065$, than those who were non-affirmed. There was little difference between conditions in terms of accuracy of recall for words that did not appear in the text, $F(1, 50) = 2.11$, $p = .15$. No other effects involving condition approached significance, Condition, $F(1,49) < 1$, $p = .43$; Condition X Threat, $F(1,49) < 1$, $p = .76$; Condition X Threat X Presentation, $F(1,49) = 2.81$, $p = .10$.

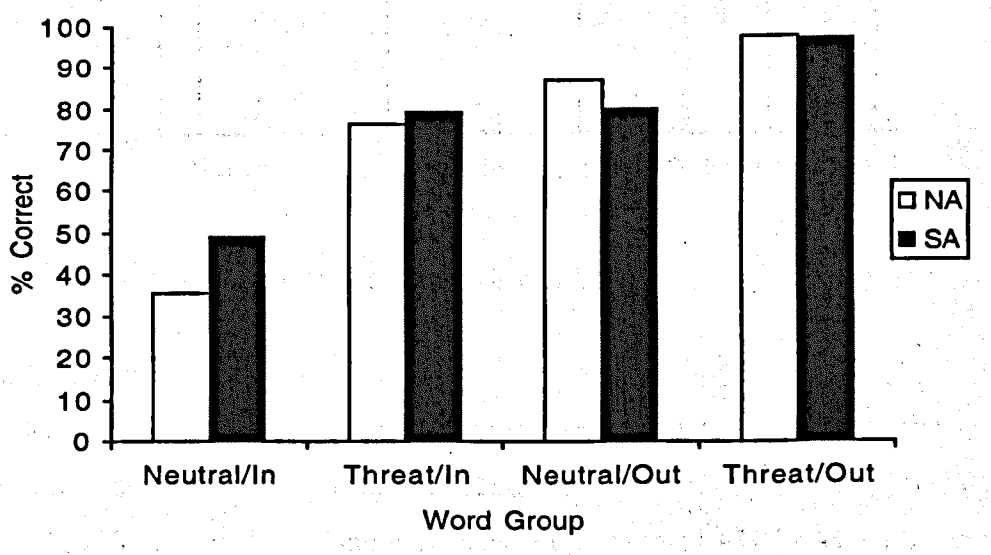

Figure 4.1. Accuracy of word recall, by condition and threat.

Analysis of latency of responses revealed significant main effects of threat, $F(1, 50) = 10.73$, $p = .002$, and presentation, $F(1, 50) = 21.66$, $p < .001$, and a Threat X Presentation interaction, $F(1, 50) = 30.10$, $p < .001$. Participants were quicker to respond to words that were not presented in the text and to threatening words (See Figure 4.2). The analysis also produced a three way interaction of Condition X Threat X Presentation, $F(1, 50) = 4.76$, $p = .034$. Inspection of data in Figure 4.2 suggested that self-affirmed participants were slower to respond to all the word groups except threatening words that appeared in the message. However, analysis of simple effects did not reveal any significant differences between self-affirmed and non-affirmed participants at the individual word group levels, Neutral/In, $F(1, 50) < 1$, $p = .33$;

Threat/In, $F(1, 50) < 1, p = .69$; Neutral/Out, $F(1, 50) = 2.69, p = .11$, Threat/Out, $F(1, 50) = 2.44, p = .13$.

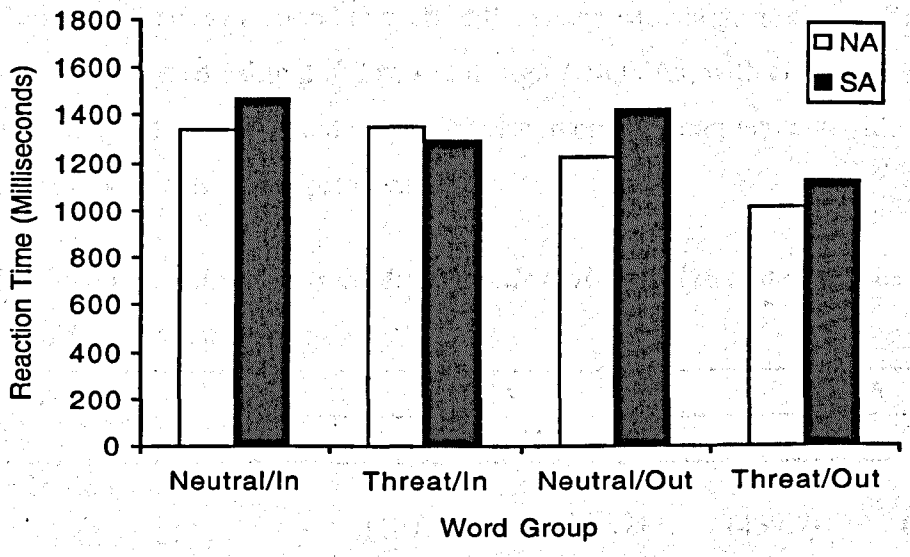

Figure 4.2. Latency of responses to recall of words.

Motive statements

Responses to statements in each category (e.g., counter-arguing, minimisation, denial of relevance, message serious and genuine, and depth of processing) were combined for further analysis. One-way between-participant ANOVAs, with condition as the independent variable, revealed a significant difference in the number of counter-arguments self-affirmed and non-affirmed participants endorsed, with self-affirmed participants agreeing with fewer counter-arguments (Table 4.5). There were no differences in the tendency of self-affirmed and non-affirmed participants to agree with statements minimising or suggesting the evidence was genuine and serious, or in their responses to the depth of processing or denial of personal relevance statements.

Table 4.5. *Agreement with Statements Reflecting Response to the Article.*

Statement agreement	SA	NA	F (1,50)	p
Counter-arguing	0.85 (0.92)	1.36 (0.76)	4.69	.035
Minimisation	5.73 (0.72)	5.60 (1.15)	0.24	.63
Serious and genuine	4.07 (1.14)	4.30 (1.06)	0.25	.62
Denying relevance	1.12 (1.11)	1.56 (0.96)	2.34	.13
Thought deeply about information	2.12 (1.11)	2.08 (1.19)	0.01	.91

Note. Higher values indicate participants agreed with more of the statements.

Latencies of responses

Reaction times to respond to each of the statement categories are in Table 4.6. The data were analysed using 2 X 2 mixed design ANOVAs, with condition as the between participants variable and response (disagreement or agreement with statement) as the within participants variable.

Table 4.6. *Mean Reaction Times in Milliseconds to Respond to Statements as a Function of Condition and Agreement.*

Statement	SA		NA	
	Agree	Disagree	Agree	Disagree
Minimisation	3162.6	3313.3	2972.0	3255.1
	(601.1)	(1180.9)	(439.7)	(1115.0)
Serious and genuine	2536.9	3886.8	2636.2	3273.7
	(520.1)	(1229.1)	(693.9)	(443.8)
Counter-arguing	3306.2	3026.6	2922.7	3267.5
	(1235.1)	(811.8)	(808.7)	(1200.6)
Denying relevance	3118.2	2739.6	3097.8	2806.9
	(1022.9)	(862.3)	(723.3)	(842.4)
Thought deeply about information	2171.7	3207.2	2355.4	2438.5
	(612.7)	(1055.2)	(591.7)	(688.9)

Minimisation. Analysis of participants' responses to the minimising statements revealed no significant effect of condition, $F(1, 45) < 1$, or response, $F(1, 45) = 2.27$, $p = .14$. Nor was the Condition X Response interaction significant, $F(1, 45) < 1$.

Serious and Genuine. For the statements suggesting that participants thought the health information was genuine and serious, there was no main effect of condition, $F(1, 25) < 1$. However, both response, $F(1, 25) = 14.88$, $p = .001$ and the Condition X Response interaction, $F(1, 25) = 4.31$, $p = .049$, were significant. Examination of the means suggests that though both non-affirmed and self-affirmed participants were slower to disagree than agree with the accuracy statements, this effect was most pronounced in the self-affirmed participants. Though cell numbers were small, tests of simple effects supported this; self-affirmed participants were significantly faster to

agree than disagree, $F(1, 13) = 15.04$, $p = .002$, and non-affirmed participants were not, $F(1, 10) = 2.48$, $p = .15$.

Counter-arguing. There were no significant main effects, $F(1, 34) < 1$ or an interaction, $F(1, 34) = 1.17$, $p = .29$, for latencies to respond to the counter-arguing statements.

Denial of Personal Relevance. For reaction times to respond to the denial of relevance items there was a main effect of response, $F(1, 36) = 4.62$, $p = .039$, with both non-affirmed and self-affirmed participants responding quicker to disagree with the denial statements. There were, however, no significant effects involving condition, $F(1, 36) < 1$.

Depth of Processing. Analysis of reaction time to respond to the depth of processing items revealed a main effect of response, $F(1, 18) = 10.03$, $p = .007$, and that the interaction of Condition X Response approached significance, $F(1, 18) = 4.18$, $p = .060$. Examination of the means suggests that though both non-affirmed and self-affirmed participants were slower to disagree than agree with the depth of processing statements, this effect was most pronounced in the self-affirmed participants. Unfortunately, however, cell numbers ($6 < n < 8$) did not permit tests of simple effects.

Questionnaire data

Unless otherwise stated, questionnaire data were analysed using 2 X 2 ANOVA for mixed designs, with condition (self-affirmed or non-affirmed) as a between-participants variable and time (immediately after self-affirmation [Time 1] or after one week [Time 2]) as the within-participants variable. Where item wording differed at Time 1 and 2, data at each time point were analysed separately using one-way between-participants ANOVAs, with condition as the independent variable.

In total, 45 (88%) participants completed the one-week follow-up. Of the six participants who did not complete the follow-up, five were self-affirmed and one non-affirmed. Two self-affirmed participants were debriefed at week one for ethical reasons, as they showed signs of anxiety after reading the health information. The further participants were debriefed either in person or via email.

Personal acceptance. Data for participants' risk perceptions are in Table 4.7. Participants' risk perceptions were analysed using three-way ANOVA for mixed designs, with condition (self-affirmed or non-affirmed) as a between-participants

variable and time (Time 1 or Time 2) and target (self or average other) as within-participants variables.

Table 4.7. *Mean Responses to Measures of Risk Perceptions by Self-affirmation Condition*

	SA		NA	
	Time 1 (n = 26)	Time 2 (n = 21)	Time 1 (n = 25)	Time 2 (n = 24)
FBD risk				
Self	5.92 (2.21)	4.38 (1.72)	4.84 (2.85)	4.71 (2.68)
Other	5.77 (1.97)	4.52 (1.72)	4.92 (2.25)	4.71 (1.97)
Breast cancer risk				
Self	4.04 (2.37)	3.38 (1.80)	3.92 (2.27)	3.17 (2.10)
Other	3.96 (2.30)	3.24 (1.79)	3.84 (1.91)	3.08 (1.89)

Note. Higher scores indicate higher risk perceptions.

Analysis of participants' risk perceptions for FBD revealed a significant main effect of time, $F(1, 43) = 22.86$, $p = .001$. Participants reported lower risk perceptions after one week. The Condition X Time interaction also approached significance $F(1, 43) = 3.38$, $p = .07$. Self-affirmed participants reported a greater reduction in risk perceptions after one week. Tests of simple effects, however, did not reveal a significant difference between condition at either Time 1, $F(1, 50) = 2.48$, $p = .12$, or at Time 2, $F(1, 44) < 1$. No other effects involving condition approached significance, Condition, $F(1, 43) < 1$; Condition X Target, $F(1, 43) < 1$; Condition X Time X Target, $F(1, 43) < 1$. Interestingly, both self-affirmed and non-affirmed participants reported themselves to be at about the same risk of FBD as the average other, $F(1, 43) < 1$, demonstrating no optimistic bias in their judgements.

Analysis of participants' risk perception for breast cancer revealed only a significant main effects of time, $F(1,44) = 11.97$, $p = .001$. Both self-affirmed and non-affirmed participants reported lower risk perception after one week. No effects involving condition approached significance, Condition, $F(1, 43) < 1$; Condition X Time, $F(1, 43) < 1$; Condition X Target, $F(1, 43) < 1$; Condition X Time X Target, $F(1, 43) < 1$. Both self-affirmed and non-affirmed participants did not report an optimistic bias in the risk judgments for breast cancer, $F(1, 43) < 1$.

There were no significant effects of self-affirmation on intentions or expectation to change, perceptions of personal relevance, or relevance to the average

other, worry, ease of imagination for either FBD or breast cancer, or likelihood of forgetting content of article (Table 4.8). There was a significant main effect of time for participants' reports of worry, $F(1, 43) = 4.76$, $p = .035$, and ease of imagining FBD, $F(1, 43) = 5.76$, $p = .02$. Participants in both conditions reported being less worried after one week, and finding it harder to imagine developing FBD.

Both self-affirmation and non-affirmed participants reported the article to be personally relevant, being marginally worried, and that they were unlikely to forget about the article in a couple of days. Those in both conditions also reported difficulty in imagining developing either FBD or breast cancer as a result of drinking caffeine.

Table 4.8. *Mean Responses on Items Measuring Personal Message Acceptance*

	SA		NA		F Condition (C) (1, 43)	F Time (T) (1, 43)	F C X T (1, 43)
	Time 1 ($n = 26$)	Time 2 ($n = 21$)	Time 1 ($n = 25$)	Time 2 ($n = 24$)			
Worry	3.38 (1.61)	2.95 (1.40)	3.38 (1.29)	3.02 (1.45)	0.20	4.76*	0.56
Intentions	3.02 (1.93)	2.81 (1.79)	3.24 (1.58)	2.67 (1.82)	0.26	2.27	2.27
Expectations	2.62 (1.90)	2.29 (1.95)	2.72 (1.65)	2.04 (2.18)	0.01	1.79	0.46
Relevance							
Self	4.62 (1.33)	4.62 (0.92)	5.12 (0.97)	4.71 (1.16)	1.15	2.13	3.37
Other	4.62 (1.27)	4.71 (0.78)	4.88 (1.20)	4.71 (1.16)	0.54	0.14	2.07
Impact of article	2.46 (1.82)	2.86 (2.13)	2.28 (1.86)	3.33 (2.01)	0.12	--	--
Imagine							
FBD	1.92 (1.26)	1.48 (1.08)	2.00 (1.71)	1.71 (1.37)	0.07	5.76*	0.88
Breast cancer	1.19 (1.30)	0.71 (0.85)	1.08 (1.26)	1.00 (1.22)	0.37	2.23	0.46

Note. Higher values indicate greater levels of worry, intentions, personal relevance, ease of imagination, and impact of article. Empty cells indicate items were worded differently at Time 1 and 2. *$p < .05$.

General message acceptance

The data for measures of general message acceptance are in Table 4.9. Analysis of participants' perceptions of the severity of FBD revealed a significant interaction of condition and time. Self-affirmed participants reported an increase in perceptions of severity after one week, and those who were non-affirmed a decrease. Test of simple effects, however, did not indicate significant effects of self-affirmation at either Time 1, $F(1,50) = 0.14, p = .71$, or Time 2, $F(1,44) = 2.58, p = .12$.

The interaction of condition and time for participants' belief in the link between caffeine and FBD approached significance, $F(1,44) = 3.55, p = .06$. Tests of simple effects revealed that self-affirmed participants reported significantly greater belief at Time 1, $F(1,50) = 3.99, p = .05$, but not at Time 2, $F(1,50) < 1$.

Table 4.9. *Mean Responses on Items Measuring General Message Acceptance.*

	SA		NA		F Condition (C) (1, 43)	F Time (T) (1, 43)	F C X T (1, 43)
	Time 1 ($n = 26$)	Time 2 ($n = 21$)	Time 1 ($n = 25$)	Time 2 ($n = 24$)			
FBD							
Severity	5.54 (1.82)	6.14 (1.77)	5.72 (1.67)	5.17 (2.24)	0.38	1.27	13.77**
Belief	4.77 (1.21)	4.05 (1.20)	4.00 (1.53)	3.96 (1.68)	0.82	3.55	3.55
Evidence strength	2.31 (1.46)	2.29 (1.35)	2.56 (1.64)	2.75 (1.92)	0.87	0.09	0.09
Breast cancer							
Severity	9.04 (1.15)	9.10 (0.77)	9.28 (0.84)	9.25 (0.85)	0.92	0.30	0.30
Belief	3.04 (1.61)	2.71 (1.23)	2.76 (1.61)	2.46 (1.56)	0.71	2.97	0.11
Evidence strength	3.62 (1.55)	3.76 (1.51)	3.56 (1.83)	4.04 (1.81)	0.76	1.19	0.19

Note. Higher values indicate greater belief in message and perceptions in severity, and that participants perceived the evidence as weaker. $^{**}p < .01$.

Self-affirmation did not influence participants' ratings of evidence strength, their belief in the link between caffeine and breast cancer, or how severe a health disorder they perceived breast cancer to be. Those in both groups reported believing in the link between caffeine and FBD, and disagreed that the evidence was weak. Overall, participants saw the evidence linking breast cancer and caffeine as weak.

Thoughts about article. There were no significant differences in the extent self-affirmed and non-affirmed participants reported having thought deeply about the information, about the amount of caffeine they drank, their risk of breast cancer, having avoided thinking about how the article applied to them, or worried about their caffeine consumption either immediately after reading the article or after one week (Table 4.10). Participants did not differ in their reports of talking to friends about the article or researching the risks of caffeine for themselves.

Table 4.10. *Participants' Thoughts During and After Reading the Article.*

	SA		NA		T1	T2
	Time 1 (n = 26)	Time 2 (n = 21)	Time 1 (n = 25)	Time 2 (n = 24)	F (1, 50)	F (1, 43)
Thought deeply about the information	4.04 (1.31)	2.62 (1.91)	4.36 (1.32)	3.00 (1.41)	0.39	0.59
Thought about caffeine intake	4.81 (1.02)	3.24 (1.70)	5.04 (1.02)	3.33 (1.46)	0.66	0.04
Thought about risk of breast cancer	3.54 (1.63)	2.48 (2.06)	4.08 (1.73)	2.58 (1.61)	0.26	0.04
Worried about caffeine consumption	3.73 (1.97)	2.52 (3.04)	3.84 (1.57)	3.04 (1.57)	0.83	1.01
Avoided thinking about article	1.58 (1.45)	1.62 (1.53)	1.64 (1.52)	1.67 (1.40)	0.02	0.01
Talked to friends about article	--	2.05 (2.01)	--	2.42 (1.69)		0.45
Researched FBD for myself	--	0.05 (0.22)	--	0.08 (0.28)		0.22

Note. Empty cells mean data not collected.

Recall of information

Participants' recall of the article after one week are in Table 4.11. Data were analysed using one-way between-participants ANOVA, with condition as the independent variable. Self-affirmed and non-affirmed participants did not differ in the number of facts they recalled about the article overall. Self-affirmed participants did, however, recall less risk-disconfirming evidence and more information about the risks of FBD associated with smoking, compared to those who were non-affirmed. There were no differences between the two groups in terms of the amount of general, risk-

confirming, or recommendation information they recalled, or the number of incorrect recalls.

Table 4.11. *Participants' Recall of the Article after One-Week.*

	SA ($n = 21$)	NA ($n = 24$)	F (1, 44)	p
Total facts recalled	7.95 (2.58)	7.88 (2.21)	0.01	.91
Recall general information	2.33 (1.15)	2.38 (1.28)	0.01	.91
Recall risk confirming information	3.52 (1.50)	3.58 (1.35)	0.02	.89
Recall risk disconfirming information	0.52 (0.75)	1.13 (1.14)	4.26	.045
Recall recommendations	0.62 (0.59)	0.58 (0.50)	0.05	.83
Recall information about risk of smoking	0.71 (0.72)	0.13 (0.34)	12.45	.001
Recall information incorrectly	0.33 (0.58)	0.54 (0.83)	0.92	.34

Note. Higher scores indicate more facts recalled.

Caffeine consumption. Participants' reports of their typical caffeine consumption over the last week and their consumption the previous day were combined into a single item, $r(45) = .78$, $p < .001$. A one-way ANCOVA with condition as a between participants variable (self-affirmed or non-affirmed), and pre-manipulation reports of caffeine consumption as a covariate was performed. Participants' caffeine consumption prior to the manipulation significantly predicted their caffeine consumption after one week, $F(1, 44) = 18.00$, $p < .001$. Self-affirmed participants reported drinking slightly less caffeine a week after reading the health message (mean = 2.76), than those who were non-affirmed (mean = 3.56), a difference that approached significance, $F(1, 44) = 3.82$, $p = .057$.

Linear regressions were conducted to test whether participants' belief in the link between caffeine and FBD at Time 1 mediated the reduction in caffeine consumption. Following Baron and Kenny (1986), three regressions were conducted. A first regression confirmed that condition predicted the mediator, belief in the FBD caffeine link, $R^2 = .08$, ß = .27, $t(50) = 2.00$, $p = .05$. Second, condition predicted the dependent variable, change in caffeine consumption, $R^2 = .09$, ß = .29, $t(44) = 2.00$, $p = .052$. Finally, when change in caffeine consumption was regressed simultaneously

on belief in link and condition, $R^2 = .28$, $F(2, 44) = 8.25$, $p = .001$, the effects of belief in link remained significant, ß = .46, $p = .002$, but condition was not, ß = .18, $p = .18$. Thus there is evidence that the effects of self-affirmation upon caffeine consumption were mediated by belief in the link between FBD and caffeine.

To test whether the reduction in self-affirmed participants' risk perceptions for FBD reflected a reduction in participants' caffeine consumption, risk perceptions of those in the self-affirmed condition were examined using linear regression analysis. Changes in caffeine consumption were calculated by subtracting caffeine consumption at Time 1 from caffeine consumption at Time 2, with lower scores corresponding to a reduction in caffeine intake. Change in caffeine consumption significantly predicted risk perceptions at Time 2, ß = -.33, $p = .029$. However, those who reported the greatest reductions in caffeine consumption also reported the highest risk perceptions at Time 2.

Self-esteem as a moderator

Moderated regressions were conducted to test whether self-esteem moderated the effects of self-affirmation on the dependent measures (see Chapter 2 for more detailed description). At step one condition and self-esteem were entered, and the interaction at step two.

Though self-esteem was found to predict article choice, ß = .12, $p = .049$, with those with higher self-esteem choosing the more threateningly titled article more often, self-esteem did not moderate the effects of self-affirmation on choice of article, ß = -.10, $p = .44$. Nor did self-esteem moderate the effects of self-affirmation on agreement with statements reflecting defensiveness or depth of processing.

Moderated regression for participants' questionnaire responses at Time 1 revealed that self-esteem did not moderate the effects of condition on the measures of general message acceptance (Table 4.12).

Table 4.12. *Summary of Moderated Regression Analysis for Condition X Self-esteem to Predict Measures of General Acceptance.*

Variable	*B*	*SE B*	ß	*p*	F (1, 49)	R^2
FBD						
Belief	.41	.35	.16	.25	2.25	.13
Evidence strength	-.04	.37	-.01	.91	3.70	.19
Severity	-.42	.45	-.14	.34	0.68	.04
Breast cancer						
Belief	.22	.42	.07	.61	0.40	.03
Evidence strength	.22	.44	.07	.63	0.22	.01
Severity	.07	.26	.04	.78	1.18	.07

Analysis of participants' response on measures of personal acceptance indicated that self-esteem typically did not moderate the effects of self-affirmation. The exceptions were the measures of self-risk of FBD and ease of imagining breast cancer (Table 4.13).

Table 4.13. *Summary of Moderated Regression Analysis for Condition X Self-Esteem to Predict Measures of Personal Acceptance.*

Variable	*B*	*SE B*	ß	*P*	F (1, 49)	R^2
FBD						
Self risk	1.40	.61	.30	.026	4.14	.21
Other risk	.72	.54	.19	.19	1.59	.03
Imagine	.54	.36	.20	.14	3.21	.17
Breast cancer						
Self risk	.53	.59	.13	.37	0.97	.06
Other risk	.23	.55	.06	.68	0.21	.01
Imagine	.72	.31	.31	.025	2.62	.14
Worry	.09	.36	.04	.26	1.79	.05
Intentions	.20	.44	.06	.65	1.49	.03
Expectations	.18	.46	.06	.70	0.46	.03
Relevance						
Self	-.11	.29	-.05	.70	2.59	.14
Other	.04	.32	.02	.91	0.20	.01
Behaviour change	.81	.52	.23	.13	1.48	.10

Analysis of participants' FBD self risk perceptions revealed that both self-esteem, $\beta = -.29$, $p = .032$, and the Condition X Self-esteem interaction, $\beta = -.30$, $p = .026$, were significant predictors. Those with higher self-esteem made lower risk judgments. Simple slopes analysis revealed that self-affirmation significantly increased risk perceptions of those with high self-esteem, $\beta = .47$, $p = .01$, but had no effect on those with moderate, $\beta = .20$, $p = .136$, or low self-esteem, $\beta = -.08$, $p = .67$ (Figure 4.3).

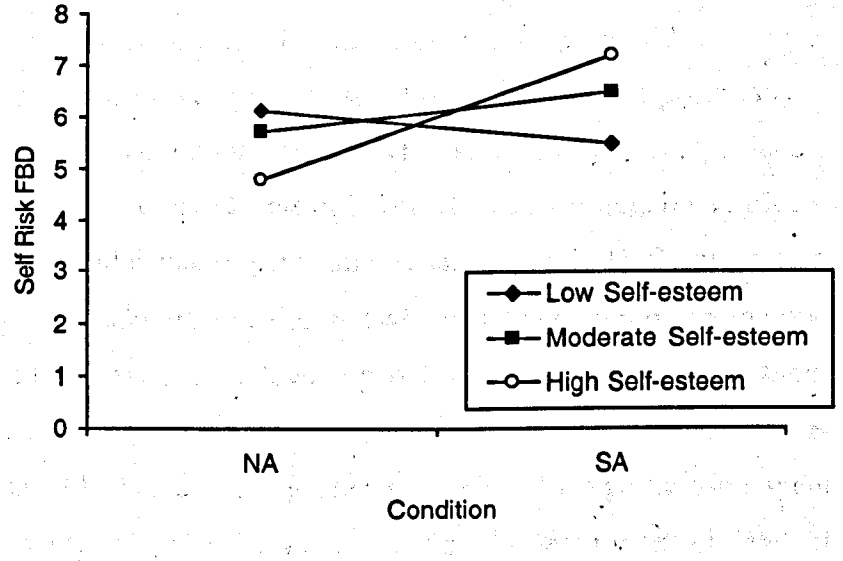

Figure 4.3. The effect of self-affirmation on FBD risk perceptions as a function of self-esteem: Simple slopes at three levels of self-esteem.

Self-esteem was also found to moderate the effects of condition on ease of imagining developing breast cancer. Simple slopes analysis revealed that self-affirmation marginally increased ease of imagination for those with high self-esteem, $\beta = .32$, $p = .087$, but had no effect on those with moderate self-esteem, $\beta = .03$, $p = .81$, or low self-esteem, $\beta = -.25$, $p = .17$.

Discussion

The results of the present study suggest self-affirmation can influence orientation to threat, motives for processing information, and caffeine drinking behaviour, following a health threat outlining the potential negative effects of drinking caffeine. Self-affirmation also promoted general acceptance of the message in terms of an increase in belief in the link between FBD and caffeine at Time 1. However, self-

affirmation was not found to influence personal acceptance of the message. Furthermore, examination of the durability of the effects suggested that after one week there were no differences between self-affirmed and non-affirmed participants' reports of belief in the message. There was, however, some evidence that self-affirmed and non-affirmed participants differed in their recall of the health threat after one week and their caffeine consumption, suggesting self-affirmation may have had some durable effects.

Self-affirmed participants were more likely to choose to read the more threateningly titled health information than those who were non-affirmed. In comparison to Reed and Aspinwall (1998), the current study provides stronger evidence that self-affirmation can reduce attentional avoidance of potentially threatening self-relevant health information. Thus self-affirmation can reduce defensive processing at multiple levels of information processing, both influencing orientation to threat, and denial of personal inferences (Study 1). By promoting greater openness to negative health information self-affirmation could provide an important first step in a health intervention, allowing people to recognise a potential threat.

The present study also sought to test whether self-affirmation influences the depth of processing of a health message, measuring how long participants spent reading the health article, their recall of information and self-reports of depth of processing. Self-affirmed and non-affirmed participants did not differ in terms of reading time, which suggests that participants did not differ in the effort they applied to understanding the content of the message or their depth of processing.

Examination of participants' recall of words that appeared in the message immediately after reading the article revealed that those in both conditions were fairly accurate at identifying words that did not appear in the text. For the words that did appear in the message, self-affirmed participants were more accurate than those who were non-affirmed, particularly at identifying neutral words in the message. This increase in accuracy of recall suggests that self-affirmed participants may have paid more attention to the content of the article, and thus been better able to recall neutral words presented.

The speed at which participants made judgements about which words appeared in the text also suggests that self-affirmed and non-affirmed participants may have

differed in their depth of processing. Self-affirmed participants were slower to make decisions for all word groups apart from the threatening words that appeared in the message. This greater thinking time could reflect the fact that self-affirmed participants paid more attention to the message and thus required more time to consider the content before making a judgement. Alternatively, self-affirmed participants may have processed the information in less depth and taken longer to make judgements as they were less sure which words appeared in the message. It is also plausible that self-affirmed participants did not differ in their depth of processing, but an increase in thinking time could reflect self-affirmed participants taking the task more seriously. Self-affirmation may act not just to influence participants' reaction to the health message, but also to the task itself, such that self-affirmed participants felt it was more important to complete the task accurately. This explanation could suggest that self-affirmed participants had a greater desire to be accurate in all aspects of the task, or perhaps that they displayed greater demand characteristics.

Further evidence relevant to the depth of processing participants applied to the message comes from their self-reports of depth of processing. Non-affirmed and self-affirmed participants did not differ in their agreement with these statements. However, condition did have a marginal impact on participants' latencies to respond. The pattern of results suggests that, for self-affirmed participants, the goal to process the information deeply was more accessible. In line with Steele (1988), this finding may indicate that self-affirmation promoted a greater desire to process information with a goal of accuracy and to reach objective conclusions. However, depth of processing does not necessarily indicate more accurate processing. For example, defensive participants could apply a great deal of effort to processing a message, but not with the goal to be accurate, but in an attempt to find flaws and counter-argue the information (Chaiken et al., 1996, Chen & Chaiken, 1999).

The findings both in terms of reading time, recall of words and accessibility of depth of processing statements do not support the hypothesis that self-affirmation promotes mindless acceptance of the message. Instead, self-affirmed participants appeared to apply the same amount of effort as those who were non-affirmed in terms of reading time, and possibly engaged in more elaborative processing, being more accurate in their recall of words. This finding is also supported by faster reaction times

of self-affirmed participants to endorse rather than reject statements congruent with engaging in in-depth processing. Thus the increase in belief in the message immediately after reading the article did not appear to be a result of less in-depth processing.

Further evidence indicative of non-affirmed and self-affirmed participants' depth of processing comes from their recall of the article a week later. Overall, there were no differences in the amount of information participants recalled, suggesting that self-affirmed and non-affirmed participants did not differ in their original processing of the message. However, non-affirmed participants did recall more of the risk-disconfirming evidence than those who were self-affirmed. Reed and Aspinwall (1998) also reported that their self-affirmed participants recalled less of the risk-disconfirming evidence. This finding could reflect differences in the way non-affirmed and self-affirmed processed the information, such that non-affirmed participants paid more attention to information undermining the threat while reading the article, or that non-affirmed participants subsequently recalled information in a biased manner. In either case self-affirmation appeared to reduce this bias.

Not only did non-affirmed participants recall more risk-disconfirming evidence, but differences were also seen in recall of information relating to smoking and FBD. The information linking smoking and FBD was peripheral to the main threat information and suggested that there was weak evidence to indicate that smoking increased the risk of FBD. Self-affirmed participants recalled more of this information, even though all but one were non-smokers, for whom this information was not relevant, and therefore not potentially threatening. Whereas in Study 1, self-affirmed participants appeared to recall information peripheral to the main threat message less accurately, in the present study self-affirmed participants recalled more peripheral information and did so accurately. Contrary to the findings of Study 1, this suggests that, while non-affirmed participants focused more on the risk-disconfirming evidence (recalling more of it), possibly with a goal to defend against the message, in contrast, self-affirmed participants examined the message more broadly and were able to recall more peripheral information.

Examination of the responses to the motive statements revealed that self-affirmed participants were less likely to endorse counter-arguing statements than were

those who were non-affirmed. This difference provides further evidence that self-affirmed participants were less defensive in their response to the article. Reaction time data for responses to the "serious and genuine issue" statements were also consistent with self-affirmation promoting an accuracy as opposed to a defensive motive. Self-affirmed participants, but not those who were non-affirmed, were faster to agree than disagree with accuracy statements, suggesting that accuracy statements were more accessible to self-affirmed participants. There were, however, no differences in the accessibility of statements minimising, counter-arguing or denying the personal relevance of the message. These findings provide evidence that self-affirmation can reduce accessibility of cognitions thought to be associated with defensiveness and increase the salience of thoughts associated with an accuracy motive, using an implicit measure that is less likely to be subject to response biases (Fazio & Olson, 2003).

The data from the questionnaires provided mixed evidence for the effectiveness of self-affirmation and its durability. At Time 1, although self-affirmation promoted general acceptance of the message, in terms of belief in the link between caffeine and FBD, self-affirmed and non-affirmed participants did not differ in terms of personal acceptance, with no differences on, for example, measures of risk, worry, intentions to change, or personal relevance. Nor did participants differ in how much they had considered the message and their risk during the following week. Furthermore, though self-affirmed participants showed an increase in their belief in the link between caffeine and FBD at Time 1, by the following week there were no differences between the non-affirmed and self-affirmed participants. There was, however, some evidence to suggest self-affirmation did have some long-term effects. At Time 2, non-affirmed participants reported reduced perceptions of severity for FBD, while self-affirmed participants reported an increase. Reduction in non-affirmed participants' perceptions of severity may indicate attempts to minimise the threat, which self-affirmed participants did not do. Overall, the findings suggest that, contrary to Study 1 and the recall data in the present study, self-affirmation had little durable impact upon participants' acceptance of the health message.

One possible explanation for self-affirmation having less robust (i.e., affecting fewer explicit measures of message acceptance) and durable effects on measures of message acceptance than in Study 1 is that self-affirmation resources can be depleted.

If self-affirmation provides participants with a resource to deal with threat, by boosting their sense of self-integrity, this resource could potentially be used up. Steele (1988) argues that self-affirmation will only be effective at reducing the impact of a self-threat when the values being affirmed are as important as those threatened (p. 291). In other words, a self-affirmation has to be as effective at restoring self-integrity as a health message is at threatening it. In the present study, the ability of self-affirmation to reduce biased processing was tested at different levels of processing. Self-affirmation was found to promote greater orientation to the more threateningly titled message. By reducing defensiveness at this (attentional) level of processing, there may have been fewer self-affirmational resources available to reduce defensive at higher levels of processing, such as personal acceptance of threat. Further research examining whether self-affirmation can be used up in such a manner would provide a valuable avenue of research.

An alternative account for the less consequential effects of self-affirmation on the questionnaire measures could be that completing the motives statement task prior to the questionnaire influenced responses on the dependent measures. Presenting participants with defensive statements may have caused them to re-evaluate their perceptions of the message and reduced the impact of self-affirmation on message acceptance. For example, presenting statements such as "You cannot worry about all the things that are meant to be bad for you" or "Drinking caffeine is ok in moderation" may have made salient defensive cognitions that could have provided an alternative route to restore self-integrity through defensive processing, and undermined the effects of the self-affirmation manipulation.

Though there were no differences in intentions between conditions, unlike the findings of Reed and Aspinwall (1998), self-affirmed participants in the present study reported drinking marginally less caffeine after one week. This change in behaviour was mediated by an increase in the belief that caffeine was linked to FBD at Time 1. The fact that self-affirmation was able to impact upon participants' caffeine drinking suggests that, despite the few changes on questionnaire-based measures, affirming one's values did provide an effective means of increasing acceptance of a health threat and lead to changes in behaviour. In Study 1, though self-affirmed participants reported increased intentions to change this was not reflected in actual alcohol

drinking behaviour. The fact that the present study was more effective in inducing changes in behaviour may result from the nature of the behaviour targeted. Caffeine drinking is a behaviour less complex in its aetiology, and possibly easier to change than alcohol consumption. Thus this finding does not necessarily indicate that self-affirmation in the present study had a stronger impact upon participants, but may reflect differences in the behavioural responses measured.

In contrast to the effects of self-affirmation on participants' belief in the link between FBD and caffeine, which decreased over time, the data for caffeine consumption supports self-affirmation having some durable effects. However, the present data do not permit speculation as to whether this change in caffeine consumption would be maintained, especially in light of reduction in the belief in the link between FBD and caffeine over the following week. Due to the fictitious nature of the health information participants had to be debriefed about the health threat and further follow-ups were not possible to test for more long-term changes in behaviour.

Self-esteem as a moderator

Self-esteem was found to moderate the effects of self-affirmation on participants' risk perceptions of FBD and ease of imagining developing breast cancer, such that self-affirmation was most effective at boosting risk perceptions and ease of imagination among those with high self-esteem. This finding is consistent with Steele et al. (1993) who argue that those with high self-esteem are more adept at self-affirmation following a threat. Also consistent with Steele, those with high self-esteem were found to be more likely to choose the more threateningly titled article, regardless of condition. Thus, those with high self-esteem appeared to have more resources to orientate towards negative, personally-relevant information. The findings relating to self-esteem were not however consistent. Contrary to Steele, those with high self-esteem in the non-affirmed group reported the lowest risk perceptions for personally experiencing FBD. Rather than those with high self-esteem having greater resources to accept the health-threat, they appeared to be more defensive in their risk judgments. In addition, self-esteem did not moderate all the effects of condition. For example, self-esteem did not moderate orientation to threat, with self-affirmation being effective in reducing attentional avoidance for both those with high and low self-esteem. Furthermore, self-esteem did not moderate the effects of self-affirmation on behaviour,

general acceptance of the message, or the majority measures of personal acceptance. Study 5 provides a further test of self-esteem as a moderator of the effects of self-affirmation using, in addition to the Robin et al (2001) measure of self-esteem, the more widely used Rosenberg (1965) self-esteem scale.

Mood as a mediator

The present study provided further evidence that positive and negative mood, as rated on explicit measures, do not mediate the effects of self-affirmation.

Limitations

A limitation of the present study is the relatively small sample size. In the present study, participants were naïve to the fact that they were selected on the basis of their reports of caffeine consumption. This was done to reduce demand characteristics, for instance the participants may have been less likely to respond in ways to please the experimenter if they were not aware of the true nature of the study. Though this approach to recruiting participants has some benefits it also made recruiting participants more challenging, as there were only a limited number of women who reported regularly drinking more than 2 caffeinated drinks each day on the self-reports collected prior to the experiment. To overcome this problem with recruiting participants Study 4 uses a different medium, by recruiting participants via the Internet. This allowed a much larger sample to be recruited, as well as having the benefit of targeting a non-student sample, thus providing a further test of the validity of the effects of self-affirmation.

Summary

The findings of this study provide evidence that self-affirmation can reduce biased processing at an attentional level. Consistent with the predictions of Steele (1988), self-affirmed participants' greater belief in the health message did not appear to be associated with a reduction in depth of processing. Although in comparison to Study 1 self-affirmation had a less robust effect on the explicit measures of message acceptance, self-affirmed participants did report reducing their caffeine consumption after one-week. Both the change in behaviour and the reduction in attentional avoidance of threat suggest that self-affirmation may have potential as an applied technique.

CHAPTER 5: DEPTH OF PROCESSNG AND SENSITIVITY TO MESSAGE STRENGH

In Study 1 self-affirmation promoted acceptance of the personal implications of a health message and increased participants' intentions to change. Study 3 provided evidence that self-affirmation could increase orientation to a negative and self-relevant health message. Self-affirmed participants in Study 3 also reported a greater belief in the health message, which did not appear to be a result of less in-depth processing. The present study provides a further test of the effects of self-affirmation on depth of processing, examining participants' sensitivity to arguments presented in a message as an index of depth of processing.

In Study 3 the balance of evidence suggested that self-affirmation did not reduce participants' depth of processing. For instance, self-affirmed and non-affirmed participants spent equally as long reading the article, recalled the same amount of information after one week, and did not differ in their self-reports of depth of processing. Indeed, self-affirmed participants were slightly more accurate in their recall of words in the article than those who were non-affirmed. Examination of the latencies of participants' responses, however, revealed that self-affirmed participants were slower to decide whether a word appeared in the text for all but threatening words in the message. This finding could reflect the fact that self-affirmed participants processed the message in greater depth, with more information interfering with retrieval of words, or that they processed the message in less depth, and took longer to decide because they had paid less attention to the message. Alternatively, the difference may reflect the fact that self-affirmed and non-affirmed participants differed in the effort they applied to the task. For instance, self-affirmed participants may have taken more care in their judgements. The reason for the difference in time taken to recall is unclear, and may reflect differences in depth of processing.

Previous research including measures indicative of depth of processing have suggested that self-affirmation does not necessarily lead to systematic processing of threatening messages. Reed and Aspinwall (1998) found that self-affirmed participants were faster to orientate to threat, but also spent less time than non-affirmed participants reading threatening information. In Reed and Aspinwall's study, self-affirmed participants also reported risk-confirming evidence to be more convincing than non-

affirmed participants, but did not recall it better a week later. In fact self-affirmed participants remembered less of the risk-disconfirming evidence than did controls. This finding was replicated in Study 3 and could either reflect a reduction in biased processing of the risk-disconfirming evidence, or the fact that self-affirmed participants paid less attention to the message.

Further evidence that self-affirmation may reduce systematic processing of health threats comes from Sherman et al. (2000). In Study 2, in which participants watched a video about the risks of HIV, non-affirmed participants who recognised their potential risk of HIV in terms of similarity to people with AIDS, reported greater risk perceptions. This was not the case for self-affirmed participants. This might suggest that self-affirmed participants did not base their risk perceptions on information presented to them, and engaged in less thoughtful consideration when evaluating their risk. Non-affirmed participants in Sherman et al.'s study also reported a stronger association between their risk perceptions and intentions to use condoms (cited in Klein, 2004). Furthermore, Klein et al. (2001) found that, whereas non-affirmed and non-threatened participants' risk perceptions for heart disease were based on their risk factor standing, risk perceptions of those who were both self-affirmed and threatened were associated with their level of self-esteem. These findings suggest that self-affirmed participants were not necessarily processing risk information in a systematic manner or reaching conclusions based on elaborate processing of the information. Instead self-affirmation may lead to more deductive (i.e., top-down) processing of health threats.

As an additional test of whether self-affirmation promotes objectivity and unbiased systematic processing, or mindless acceptance of a health message, the current study therefore presented non-affirmed and self-affirmed participants with either a weak or strong version of a threatening health message, as a test of depth of processing.

As outlined in Chapter 1, dual process models of attitude change (e.g., the Elaboration Likelihood Model [ELM], Petty & Cacioppo, 1986; Heuristic-Systematic Model [HSM], Chaiken, 1980) suggest that people process information using two concurrent modes: an effortful, analytical, systematic approach and a less effortful, heuristic, rule-based approach. The HSM, as the name suggests, refers to these modes

as systematic and heuristic processing, while the ELM identifies these as central or peripheral routes to persuasion. These models predict that people are better able to distinguish between strong and weak messages when engaging in systematic processing, with more in-depth processing increasing the persuasiveness of strong messages and reducing the persuasiveness of weak ones (Chaiken, 1980).

According to the HSM the depth of processing people will apply to a message and the outcome for persuasion depends on both capacity, and level and type of motivation. Capacity refers a person's ability to process a message. Chaiken et al. (1996) describe capacity as knowing " enough about the issue to be able to process arguments about it, and [having] enough time to be able to concentrate on the message" (p. 556). When processing capacity is low, systematic processing is less likely to occur. Greater levels of motivation, for example a strong goal to process a message accurately, may also lead participants to process a message more systematically (Chaiken et al., 1996). The level motivation to process a message can be influenced by factors such as personal relevance or involvement with the message, with evidence suggesting people process personally-relevant information more systematically and extensively (Chaiken, 1987; Petty & Cacioppo, 1986). For instance, the strength of arguments presented is more influential for high involvement participants. Conversely, heuristic cues, such as expertise of the source, have been found to have a greater impact on attitudes when involvement with the message is low rather than high (Chaiken, 1980; Petty, Cacioppo, & Goldman, 1981).

Type of motivation also influences level of processing and outcomes for persuasive communications. Chaiken, Giner-Sorolla and Chen (1996) propose that people can process information with an accuracy, defensive or impression motive. Information that is both self-relevant and negative tends to be processed defensively. Though defensive processing can occur at both levels of processing, people tend to systematically process negative, self-relevant information, scrutinising it for potential flaws and generating counter-arguments (Liberman & Chaiken, 1992; Ditto & Lopez, 1992; Edwards & Smith, 1996).

According to Chaiken et al. (1996) relevance may increase the motivation to be accurate, and prompt unbiased systematic processing for non-threatening messages. However, if a message is both relevant and threatening people may engage in biased

systematic processing. Liberman et al. (1992) tested this giving high vs. low caffeine drinkers either a low or high threat message about the risk of FBD and breast cancer associated with drinking caffeine. High relevance participants were found to expend more effort reading the information, suggesting they were engaging in more elaborate processing. They also reported a reduced belief in the link between caffeine and FBD, evidence of more biased processing.

The stage model of processing of fear appeals (Das, de Wit, & Stroebe, 2003) also suggests that participants' appraisal of the threat (how serious the threat is; how vulnerable they are) determines both the depth of processing and the processing goal. If a message is perceived as severe and relevant, this should arouse a defence motivation and in-depth processing, leading to biased systematic processing. This model suggests that, when a threatening health message is relevant, people engage in systematic processing in an attempt to counter-argue the message and minimise the impact of the threat.

These models of information processing suggest that at low levels of involvement, where participants will be less motivated to process the message in depth, self-affirmation should have little effect on message acceptance. Non-affirmed participants, for whom a message is relevant and threatening, should engage in systematic processing of the message. This processing, however, should be biased, with participants attempting to process the message to maintain their prior beliefs, or according to Steele (1988) their self-integrity. These non-affirmed participants distinguish weak and strong messages, such that a strong health message will be harder to counter-argue than a weaker message. If self-affirmation promotes acceptance of the message through the central route to persuasion and in-depth processing, then self-affirmed participants for whom the message is relevant, should also distinguish weak and strong messages. If self-affirmation also promotes less biased processing, self-affirmed participants should also show an increase in message acceptance, in comparison to controls. Alternatively, if self-affirmation promotes mindless acceptance of the message, self-affirmed participants may not distinguish between weak and strong arguments, and accept a message regardless of the strength of arguments.

One plausible explanation for self-affirmation leading to mindless acceptance of a message is that it acts to increase positive mood. Those in positive moods have been found to be equally persuaded by strong and weak messages (Worth & Mackie, 1987). Furthermore, compared to those in neutral moods, heuristic cues, such as message length, have a greater impact on persuasion in those in pleasant moods. These effects do not appear to be due to differences in motivation, but rather to differences in capacity (Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989). Self-affirmation manipulations, such as receiving positive feedback, are likely to be associated with positive affective states (Forgas, 1998). Although mood provides a plausible mechanism for the effects of self-affirmation it should be noted that studies, including those in the present thesis, have repeatedly failed to find changes in mood associated with self-affirmation (Cohen et al., 2000, Fein and Spencer, 1997; Klein et al, 2001; Sherman et al., 2000). The current study set out to measure negative and positive mood both prior to self-affirmation and after receiving the threatening health message to rule out mood as a possible mediator.

In addition to testing the effects of self-affirmation on processing of weak and strong messages, the present study also sought to extend the findings of Study 1 by presenting the same alcohol and breast cancer message to an older, non-student sample. To target older women, an Internet-based version of Study 1 was developed. The Internet is becoming an increasing important source of health information. For example, Nicholas, Gunter, Russell, and Withey (2003) estimated that more than 40% of Internet users have sought health-related information on the Internet, while in a survey of over 1100 UK Internet users, 90% reported having visited a web site for health information and medical treatment advice in the past 12 months (Brown & Williams, 2003). Using an Internet-based study not only allowed the recruitment of a non-student sample, but presented the health information in a medium many participants will be increasingly familiar with.

Self-affirmed and non-affirmed women were recruited to read either a weak or strong version of an article depicting the links between alcohol and breast cancer. Participants reported how persuaded they were by the message, how strong the evidence was, and their intentions and expectations that they would change their drinking behaviour. Following Klein et al. (2001), a measure of self-esteem was also

included to test whether self-affirmed and non-affirmed participants differed in what predicted their self-judgements.

Material development

Two versions of the alcohol and breast cancer article differing in strength were piloted. Both versions of the article were entitled "Alcohol and Breast Cancer", and were approximately 550 words in length. The strong argument version was based on the breast cancer and alcohol leaflet previously used in Study 1. As the original message was very persuasive, with participants in Study 1 rating the article as convincing and providing strong evidence, and for ethical reasons it was decided that the research from Cancer Research UK should not be altered to appear any stronger. However, the stronger version in the present study did contain further research from Prince Henry's Institute of Medical Research that did not appear in either Study 1 or the weaker version in the current study. This research was used to explain why the association between drinking alcohol and increases in oestrogen are significant, highlighting how oestrogen can play a role in both triggering the development of cancer and encouraging the growth of tumours (Appendix G).

In the weaker version of the article, the quality of the arguments was reduced, with the changes made presented in Appendix G and F. The changes generally fell under the following headings: use of less conclusive language, providing contradictory evidence, downplaying the size of the research, and changing the source. One example of how the decisiveness of the arguments was altered is as follows: while the stronger message stated "This research tells us that there is a *definite link* between alcohol and breast cancer", the weaker version informed participants: "Our research suggests that there *may be a connection* between alcohol and breast cancer" (text that was altered is highlighted in italics). An example of where the message was altered to contain contradictory evidence is presented in an extract taken from the weaker message: "Past research has been inconclusive about the role of alcohol in the development of breast cancer, with one recent large-scale international study, funded by the World Health Organisation (WHO), suggesting alcohol consumption has no link to breast cancer". The strong version of the message highlighted the scale of the research, "The sheer size of the new study, including data from around 150,000 women around the globe, allows the researchers to make the most accurate estimates ever of the risks associated

with drinking", while the weaker version did not specify the size of the study: "The Clean Living researchers claim that their new study allows them to estimate the risks associated with drinking more precisely".

The source of the article was also altered because the Cancer Research UK source was highly credible, and without making the research extremely weak and unbelievable it was difficult to get participants in the pilot study to rate the information as weak. The fictitious source chosen was designed to appear both credible and expert, and this was confirmed in participants' ratings of the source as both reliable and credible. Thus, if participants did process the message heuristically they were unlikely to rate the article as unconvincing based on the source.

Several versions of the articles were designed and tested; only data from the final versions are presented here. In total, 50 participants rated the final versions of the articles. The majority of the participants were female ($n = 36$), and participants ranged in age from 17 to 46 years old ($M = 19.8$). Participants were asked to read the article and complete a brief questionnaire. All the responses were given on a 9-point scale (anchored at 0 and 8).

Participants rated the content of the article on the following items: "Overall, how believable did you find the content of the article?" (*unbelievable / believable*), and "How convincing did you find the content of the article?" (*unconvincing / convincing*). Participants were asked about their beliefs: "I believe that drinking alcohol increases a woman's chance of developing breast cancer" (*strongly agree / strongly disagree*). Two items measured how persuasive they found the article: "In your view, how persuasive are the arguments that there is a link between alcohol consumption and breast cancer?" and "How persuasive do you think the article will be in getting women to reduce their alcohol consumption?" (*not at all persuasive / very persuasive*). Perceptions of evidence strength were measured using the items: "The evidence linking alcohol consumption and breast cancer is ... " (*very weak / very strong, not at all conclusive / very conclusive, not at all reliable / very reliable*). Source credibility was also measured: "The source of the research (i.e., Clean Living research team or Cancer Research UK) is..." *not at all reliable / very reliable, not at all credible / very credible.* After completing the questionnaire, all participants were given a debrief sheet detailing where the information was taken from and, in the case of the weaker article,

explaining where changes had been made to the article and what the real evidence suggests (Appendix I).

The results of participants' ratings of the two articles are presented in Table 5.1. Both the strong and weak versions of the article were rated as convincing and believable, and those in both conditions believed that alcohol could increase the risk of breast cancer. The evidence presented in the stronger version was rated as being stronger, more conclusive, and more reliable. The source of the stronger version was also rated as more reliable, and more credible. The stronger version was also rated as more persuasive in general, and the effect for the ratings of how persuasive the article was to get women to reduce their alcohol consumption approached significance, $F(1,49) = 3.14$, $p = .083$.

Table 5.1. *Results of Pilot Test Examining Perceptions of Weak and Strong Arguments.*

	Strength of article		
	Weak ($N = 30$)	Strong ($N = 20$)	F (1,49)
Article believable	5.16 (1.57)	5.26 (1.53)	0.05
Article convincing	5.06 (1.01)	5.32 (1.34)	0.33
Belief in link	4.71 (1.64)	5.16 (1.57)	0.91
Evidence: Strength	3.59 (1.76)	4.85 (1.96)	5.50*
Conclusiveness	2.82 (1.87)	4.00 (2.04)	4.39*
Reliability	3.32 (2.19)	4.93 (1.82)	20.33***
Source: Reliability	4.37 (1.76)	6.36 (1.91)	11.13**
Credibility	4.41 (1.67)	6.36 (1.69)	12.46**
Persuasive arguments	3.75 (1.93)	4.79 (1.48)	5.00*
Persuasive arguments to others	2.00 (1.57)	2.79 (1.59)	3.14

Note. *** $p < .001$, * $p < .05$.

Study 4

Method

Participants

In total, 795 women accessed the website. Of these 67 did not complete the preliminary measures and were excluded from the analysis, leaving a total of 728 participants. Of these, 718 of the participants completed the study. Participants were recruited either through listservers of university staff and postgraduates, or through

links on the university website. Participants from the UK were most prevalent (96.2%, $n = 700$), with the rest of the participants coming from 16 other countries, including China ($n = 8$), Ireland ($n = 3$) and Taiwan ($n = 2$). The majority of the participants were aged between 26 and 55 years of age (57.2%, $n = 416$), with 39.2% falling between 17 and 25 years of age ($n = 285$), and 3.6% between the years of 56 and 69 ($n = 26$). Around half of the participants were in full-time employment (50.1%, $n = 370$), 12.5% were employed part-time ($n = 91$), 35.6% were in full-time study ($n = 259$), 1% ($n = 7$) were currently unemployed, and one participant was retired (0.1%).

Procedure and materials

On accessing the website participants were provided with information about what was described as a "personality and health information experiment". Participants were informed that the experiment would involve completing measures of "health behaviour and views on personal strengths". Participants were told that they would also be asked to read a short, health-related article and describe their reactions to it. Participants were reminded that their responses were confidential and that they could withdraw from the study at any point. After providing consent to participate in the study participants completed the following items: gender (*male / female*), age, the country they lived in, and occupational status (*employed full-time/ employed part-time/ retired/ unemployed/ full-time study*). Participants were then asked to answer a set of lifestyle questions. Participants were asked how often they exercised, smoked cigarettes or cigars, and ate high fat foods; these acted as filler items. The final two questions in this section assessed participants' alcohol consumption. Participants were firstly asked how much alcohol they had consumed in the past 7 days. Responses were given in terms of *pints of beer/lager/cider, shorts, glasses of wine*, and *bottles* (with illustrative examples of brands of alcoholic drinks). Participants then indicated whether or not this was typical of the amount they would drink in a normal week. Those who responded negatively were asked to record their typical consumption. The reports of alcohol consumption were later translated by the experimenter into units of alcohol. Participants' estimates for the previous week ranged from 0 units to 41.5 units, and 0 units to 60 units for a typical week. Participants' reports of alcohol consumption for the previous week and typical week were highly correlated and combined into a single item for analysis, $r(728) = .84, p < .001$. Participants were

randomly assigned to both affirmation condition and strength of article presented by the Internet programme.

Participants' attitudes towards exercise and alcohol and current mood were also measured. However, due to a technical problem, data from these items were not recorded, so no analysis was carried out involving these measures.

After completing the preliminary measures, participants were assigned randomly to either the self-affirmation task (participant's personal strengths) or non-affirmation task (David Beckham's personal strengths). These are described in more detail in Chapter 2.

The computer then presented the health information section. Participants were asked to read an article related to a health topic. They were informed that some participants would be asked to comment on how easy the article was to understand, but the experimenter was interested in their reactions to the information and how it made them feel. Participants were then presented with either the weak or strong message.

After reading the article, participants were presented with questions about their response to the article. They were asked to answer the questions as honestly and accurately as possible, without spending too much time on any one question. All responses were given on a 7-point scale unless otherwise stated (anchored at 0 and 6). Participants first reported whether the message was novel: "Had you heard about the link between alcohol and breast cancer before reading this article?" (*Yes / No / Uncertain*). Participants then completed three measures of persuasion: *general persuasion*, "In your view, how persuasive are the arguments that there is a link between alcohol and breast cancer?" (*Not at all persuasive / very persuasive*), *persuasion for women*, "How persuasive do you think the article will be in getting women to reduce their alcohol consumption?" (*Not at all persuasive / very persuasive*), *persuasion for self*, "How persuasive do you think the article will be in getting you personally to reduce your alcohol consumption?" (*Not at all persuasive / very persuasive*). Participants reported their *beliefs* associated with the message, "I believe that drinking alcohol increases a woman's chances of developing breast cancer" (*strongly disagree/ strongly agree*), and ratings of *evidence strength*, "The evidence linking alcohol and breast cancer is..." (*very weak / very strong*). Next followed two *risk* items: "How likely do you think YOU will be to experience breast

cancer as a result your current alcohol consumption at some stage in the future?", "How likely do you think the average person of your age and sex will be to experience breast cancer as a result their current alcohol consumption at some stage in the future?" (11-point scale, *impossible* [0] / *extremely likely* [10]). Then followed measures of *worry* about alcohol consumption, "I feel my level of alcohol consumption is something I...." *don't need to worry about / do need to worry about*, and "The article made me feel worried about my alcohol consumption, (*strongly disagree / strongly agree*). The worry items were significantly correlated, $r(662) = .63$, $p < .001$, and combined into a single item.

The final section included the following measures: *intentions* to reduce alcohol intake ("I intend to cut down on the amount of alcohol I drink in the next 7 days", *definitely do not intend to / definitely intend to*), *expectations* to reduce drinking ("I expect to cut down on the amount of alcohol I drink in the next 7 days", *definitely do not expect to / definitely expect to*), current *mood* ("What is your current mood" *negative / positive*), and *self-esteem* ("I have high self-esteem", 5-point scale, *not very true of me / very true of me*).

After completing the dependent measures participants were fully debriefed about the nature of the study, and provided with the complete information about the health information, including links to the original article and telephone numbers of helplines for those wanting more information about alcohol misuse and breast cancer (Appendix I).

Results

Randomisation check

A two-way ANOVA with condition (self-affirmation or non-affirmation) and article strength (weak or strong) as between-participant variables revealed that level of alcohol consumption did not differ with respect to either condition, $F(1,727) < 1$, or strength of message, $F(1,727) = 1.73$, $p = .19$ (Table 5.2), neither was the Condition X Strength interaction significant, $F(1,727) < 1$. In total, 73.7% of the participants reported that they had never heard of the link between alcohol and breast cancer before. One-way ANOVAs revealed that the distribution of those who had heard of the link did not differ with respect to condition, $F(1,710) < 1$, strength of message, $F(1,710) < 1$, or alcohol consumption, $F(1,710) = 1.53$, $p = .22$.

Table 5.2. *Alcohol Consumption by Affirmation and Strength Condition.*

	NA	SA	Weak	Strong
Alcohol consumption	7.93 (7.35)	8.18 (7.92)	8.41 (7.99)	7.68 (7.25)

Note. NA = non-affirmed; SA = self-affirmed (Applies throughout this chapter).

The present study was primarily intended to examine whether self-affirmation promoted sensitivity to strength of argument, and predicted that this relationship would be moderated by level of risk (alcohol consumption). For those who drank the highest levels of alcohol, the health message should provide a stronger threat to self-integrity. The analysis of the outcome measures involved the following between-participant independent variables: condition (self-affirmed or non-affirmed), strength of message (weak or strong), level of alcohol consumption. Self-affirmation condition and article strength were dummy coded 0 and 1. Data were analysed using three-step hierarchical regressions. At the first step, main effects of condition, strength and risk were entered. At Step 2, interactions of pairs of variables were entered, and at Step three the final three-way interaction of Condition X Strength X Risk. For ease of interpretation, mean responses on the key dependent measures as a function of condition and article strength are reported.

Measures of general message acceptance

Participants' responses to the measures of general message acceptance (e.g., ratings of article persuasiveness, evidence strength and belief) are in Table 5.3.

Table 5.3. *Mean Responses on Measures of General Message Acceptance as a Function of Condition and Article Strength.*

	SA		NA	
	Weak (n = 209)	Strong (n = 214)	Weak (n = 170)	Strong (n = 208)
Persuasion				
General	2.43 (1.33)	3.11 (1.42)	2.31 (1.41)	3.28 (1.42)
Women	1.59 (1.18)	1.93 (1.36)	1.73 (1.41)	1.90 (1.20)
Self	1.63 (1.64)	1.88 (1.63)	1.64 (1.75)	2.13 (1.67)
Belief	2.79 (1.29)	3.37 (1.27)	2.91 (1.37)	3.53 (1.32)
Evidence strength	2.44 (1.40)	3.15 (1.37)	2.30 (1.51)	3.46 (1.33)

Note. Higher values indicate the article was rated as more persuasive, to contain stronger evidence and a greater belief in the link between alcohol and breast cancer.

Persuasion ratings. Participants made three ratings of persuasion. These items were not highly correlated (*r*s ranging between .40 and .49), and as participants who did not drink any alcohol at all did not respond to the item measuring the impact of the article on them personally cutting down their alcohol consumption, the three items were analysed separately to reduce loss of power from those who were low at risk.

Analysis of the general persuasion item revealed no significant effects associated with either condition or risk (Table 5.4). Only the strength of the message affected how persuasive the arguments were perceived to be, $\beta = .28, p < .001$. Both non-affirmed and self-affirmed participants reported that the weak message was generally less persuasive than the strong message.

Table 5.4. *Moderated Regression Analysis for Measures of General Persuasiveness.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
General persuasion	1.	Condition(C)	-.00	.10	-.01	.89		
		Risk (R)	-.00	.01	-.03	.35		
		Strength (S)	.81	.10	.28	<.001	.08	20.84***
	2.	C x R	.02	.01	.04	.25		
		C x S	-.26	.21	-.05	.21		
		R x S	-.01	.01	-.03	.44	.09	11.03***
	3.	C x R x S	.00	.03	.01	.73	.09	9.46***

Note. *** $p < .001$.

Participants' reports on the item concerning how persuasive the message would be to reduce women in general's alcohol consumption suggested participants in all conditions found both versions of the article to be only slightly persuasive (Table 5.5). Hierarchical regression revealed a main effect of strength, $\beta = .10, p = .009$. There was also an interaction of Condition X Risk, $\beta = .07, p = .05$. Simple slopes analysis revealed that when drinking was moderate self-affirmation had no effect on persuasion, $\beta = -.03, p = .44$. However, at high, $\beta = -.09, p = .067$, and low levels of consumption, $\beta = -.11, p = .055$, self-affirmation had a marginally non-significant effect, acting to reduce persuasion regardless of the strength of the message.

The final measure of persuasion, examining impact on personal alcohol consumption, revealed a main effect of risk, $\beta = -.09, p = .022$, strength, $\beta = .11, p = .004$, and a Risk X Strength interaction, $\beta = -.08, p = .035$. While participants at all levels of alcohol consumption were more persuaded by the strong rather than weak

message, this effect was most pronounced in those who drank low and high levels of alcohol (low: $\beta = .20, p = .001$; moderate: $\beta = .11, p = .003$; high: $\beta = .18, p = .001$). The analysis yielded no significant effects involving condition.

Table 5.5. *Moderated Regression Analysis for Measures of Persuasiveness.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Persuasion	1.	Condition(C)	-.06	.10	-.03	.50		
Women		Risk (R)	-.01	.01	-.06	.10		
		Strength (S)	.25	.10	.10	.009	.02	3.67*
	2.	C x R	.02	.01	.07	.05		
		C x S	.22	.19	.04	.27		
		R x S	.00	.01	-.03	.48	.02	2.65*
	3.	C x R x S	.02	.03	.03	.51	.02	2.33*
Self	1.	C	-.11	.13	-.03	.36		
		R	-.02	.01	-.09	.022		
		S	.38	.13	.11	.004	.02	4.40**
	2.	C x R	.02	.02	.03	.50		
		C x S	-.21	.26	-.03	.50		
		R x S	-.04	.02	-.08	.035	.03	2.97**
	3.	C x R x S	.05	.04	.06	.14	.03	2.87**

Note. ** $p < .01$, * $p < .05$.

Belief. Participants' ratings of belief revealed no significant effects involving condition (Table 5.6). Only a main effect of strength reached significance, $\beta = .22, p < .001$. Participants reported that they believed in the link between alcohol and breast cancer after reading the stronger message, but not after reading the weaker message.

Evidence. A main effect of strength, $\beta = .31, p < .001$, indicated that participants rated the evidence in the stronger message as strong, and that in the weaker message as weak (Table 5.6). Analysis also revealed a significant Condition X Strength interaction, $\beta = -.07, p = .049$. Regardless of level of risk, and contrary to predictions, non-affirmed participants rated the weaker message as weaker and the stronger message as stronger, compared to those who were self-affirmed (Figure 5.1). No other effects approached significance.

Table 5.6. *Moderated Regression Analysis for Measures of Belief and Evidence Strength.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Belief	1.	Condition(C)	-.14	.10	-.05	.17		
		Risk (R)	-.01	.01	-.06	.13		
		Strength (S)	.59	.10	.22	<.001	.06	14.28***
	2.	C x R	.02	.01	.03	.36		
		C x S	-.02	.20	-.00	.94		
		R x S	.03	.01	.00	.98	.06	7.26***
	3.	C x R x S	-.00	.03	-.00	.97	.06	6.21***
Evidence Strength	1.	C	-.08	.11	-.03	.46		
	2.	R	-.01	.01	-.03	.40		
		S	.92	.11	.31	<.001	.10	25.98***
		C x R	.02	.01	.06	.12		
	3.	C x S	-.42	.21	-.07	.049		
		R x S	-.18	.01	-.05	.20	.11	14.45***
		C x R x S	.02	.03	.03	.49	.11	12.44***

Note. *** $p < .001$.

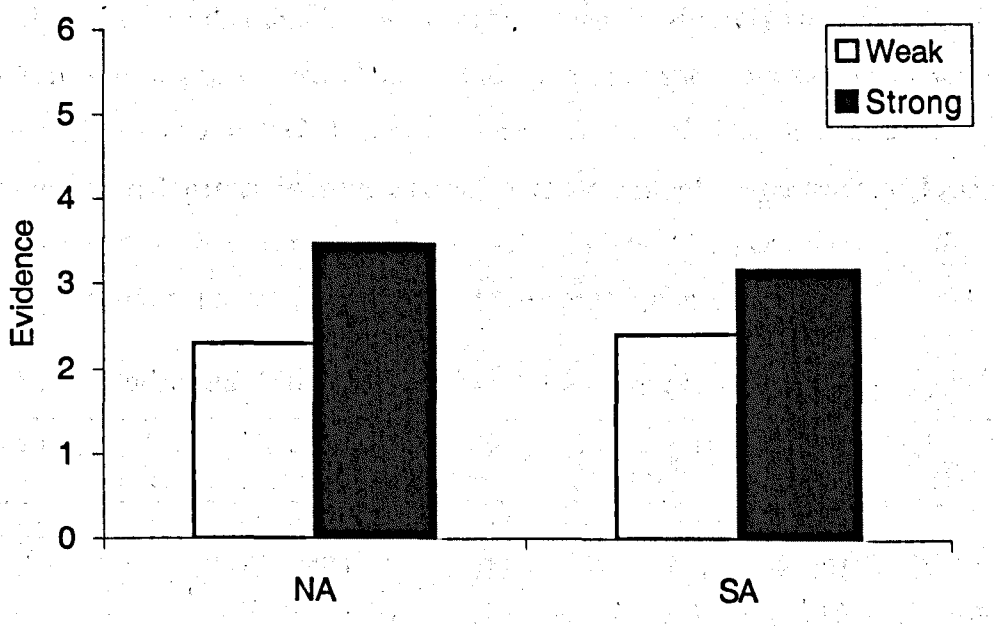

Figure 5. 1. Mean ratings of evidence strength as a function of self-affirmation condition and article strength.

Measures of personal acceptance

Participants' responses to the measures of personal message acceptance (e.g., risk perceptions, worry, intentions and expectations) are in Table 5.7. Participants' intentions to cut down their alcohol consumption and expectations that they would were highly correlated, ($r(650) = .90, p < .001$), and combined into a single item.

Table 5.7. *Mean Responses on the Measures of Personal Message Acceptance as a Function of Condition and Article Strength.*

	SA		NA	
	Weak ($n = 209$)	Strong ($n = 214$)	Weak ($n = 170$)	Strong ($n = 208$)
Self risk	2.62 (2.00)	2.68 (1.99)	2.55 (2.16)	3.05 (2.08)
Other risk	3.15 (2.10)	3.58 (2.06)	3.05 (2.13)	3.90 (2.21)
Worry	1.58 (1.60)	1.78 (1.64)	1.78 (1.77)	1.77 (1.69)
Intentions and expectations	1.78 (1.77)	1.72 (1.73)	1.52 (1.82)	1.78 (1.70)

Note. Higher values indicate greater risk perceptions, worry, and intentions.

Risk perceptions. Analysis of perception of self risk revealed main effects of both level of risk, $\beta = .41, p < .001$, and strength, $\beta = .09, p = .013$ (Table 5.8). Participants who either drank more alcohol or read the stronger message saw themselves as at greater risk. There was also a significant interaction of Condition X Strength, $\beta = -.07, p = .037$. Test of simple effects revealed that non-affirmed participants' risk perceptions were sensitive to strength of the message, $F(1, 335) = 4.44, p = .036$, with a stronger message eliciting higher risk perceptions. Self-affirmed participants did not show this same sensitivity to strength, $F(1, 335) < 1$ (Figure 5.2).

Table 5.8. *Moderated Regression Analysis for Measure of Self-Risk.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Self risk	1.	Condition(C)	-.15	.14	-.04	.28		
		Risk (R)	.11	.01	.41	<.001		
		Strength (S)	.34	.14	.09	.013	.16	46.71***
	2.	C x R	-.03	.02	-.06	.10		
		C x S	-.59	.29	-.07	.037		
		R x S	.02	.02	.04	.28	.17	24.76***
	3.	C x R x S	-.03	.04	-.02	.48	.17	21.28***

Note. *** $p < .001$

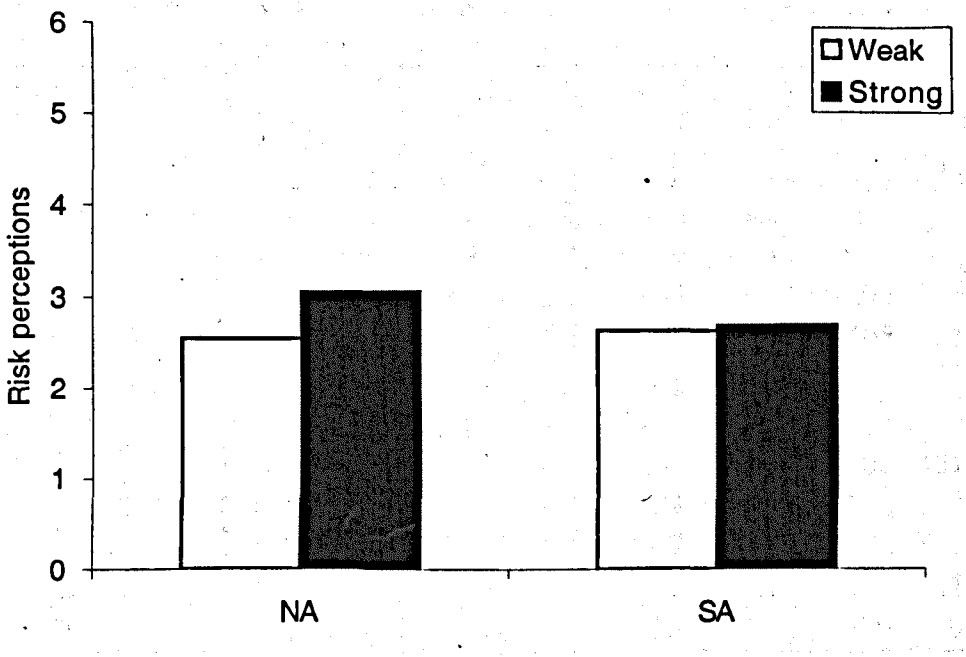

Figure 5.2. Participants' risk perceptions for self as a function of self-affirmation condition and article strength.

Risk perception for the average other only revealed significant main effects of level of risk, $\beta = .16, p < .001$, and strength, $\beta = .15, p < .001$ (Table 5.9). Participants who drank higher levels of alcohol or had read the stronger version of the message saw the average other to be at higher risk of breast cancer as a result of alcohol. No effects involving condition approached significance.

To test for any effects of self-affirmation on optimism, participants' self-risk judgements were subtracted from risk judgements for the average other, to compute a difference score with more positive scores denoting greater optimistic bias. The data are in Table 5.9. No effects involving condition approached significance.

Table 5.9. *Moderated Regression Analysis for Measures of Risk and Optimism.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Other risk	1.	Condition(C)	-.12	.16	-.03	.43		
		Risk (R)	.05	.01	.16	<.001		
		Strength (S)	.66	.16	.15	<.001	.05	11.88***
	2.	C x R	-.02	.02	-.03	.43		
		C x S	-.47	.32	-.05	.14		
		R x S	-.01	.02	-.01	.74	.05	6.41***
	3.	C x R x S	.02	.04	.01	.71	.05	5.51***
Optimism	1.	C	.04	.13	.01	.77		
		R	-.06	.01	-.28	<.001		
		S	.32	.13	.09	.014	.08	21.05***
	2.	C x R	.01	.02	.03	.44		
		C x S	.15	.27	.02	.57		
		R x S	-.03	.02	-.06	.12	.09	11.04***
	3.	C x R x S	.04	.04	.05	.22	.09	9.69***

Note. *** $p < .001$

Worry. Results of the analysis for the combined measures of worry are in Table 5.10. Analysis revealed a main effect of risk, $\beta = .46$, $p < .001$, and interaction of Risk X Strength, $\beta = .09$, $p = .014$. Those who drank more alcohol reported being more worried. Simple slopes analysis revealed that strength of message had no significant effects at any level of risk.

There was also a significant interaction of Condition X Risk, $\beta = -.08$, $p = .029$. Simple slopes analysis revealed self-affirmation did not have a significant effect at any of the individual levels of risk. However, the trends suggested that for moderate drinkers self-affirmation slightly reduced the worry, $\beta = -.03$, $p = .36$, while for low, $\beta = .05$, $p = .40$, and high drinkers, $\beta = .03$, $p = .54$, self-affirmation was associated with higher levels of worry.

Table 5.10. *Moderated Regression Analysis for Measure of Worry*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Worry	1.	Condition(C)	-.12	.12	-.04	.31		
		Risk (R)	.10	.01	.46	<.001		
		Strength (S)	.14	.12	.04	.24	.22	59.90***
	2.	C x R	.01	.02	-.08	.029		
		C x S	.04	.23	.00	.97		
		R x S	-.03	.02	.09	.014	.23	31.95***
	3.	C x R x S	-.00	.03	-.00	.97	.23	27.35***

Note. *** $p < .001$

Intentions and expectation to change. Analysis of participants' intentions and expectations to change revealed a three-way interaction of Condition X Risk X Strength, $\beta = .10$, $p = .014$ (Table 5.11). Simple slopes analyses were conducted separately for the non-affirmed and self-affirmed conditions (Figure 5.3 and 5.4). In the non-affirmed condition, reading the stronger message was associated with greater intentions to change at low, $\beta = .19$, $p = .050$, and high levels of consumption, $\beta = .17$, $p = .043$, and was marginally significant at moderate levels of consumption, $\beta = .10$, $p = .076$. However, in the self-affirmation condition, strength of the message did not predict intentions at moderate levels of consumption, $\beta = -.04$, $p = .52$. At high levels of alcohol consumption, $\beta = -.15$, $p = .051$, the stronger message was associated with marginally lower intentions and expectations to change, whereas at low levels of consumption, $\beta = -.18$, $p = .036$, the stronger message was associated with significantly lower intentions and expectations to change.

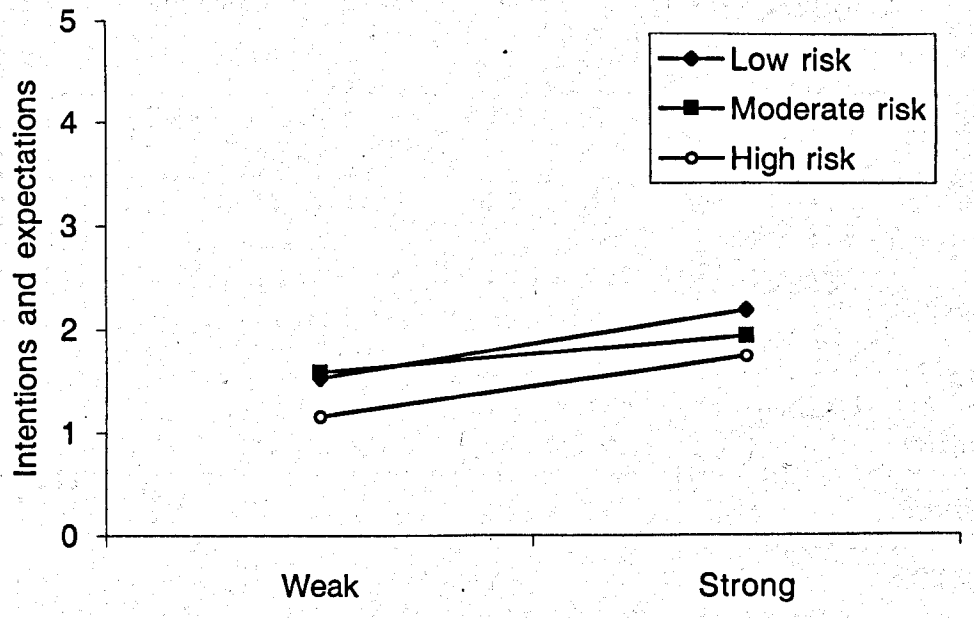

Figure 5.3. Interaction of level of risk and strength of article for reports of intentions and expectation to change among non-affirmed participants: Simple slopes for article strength at three levels of risk.

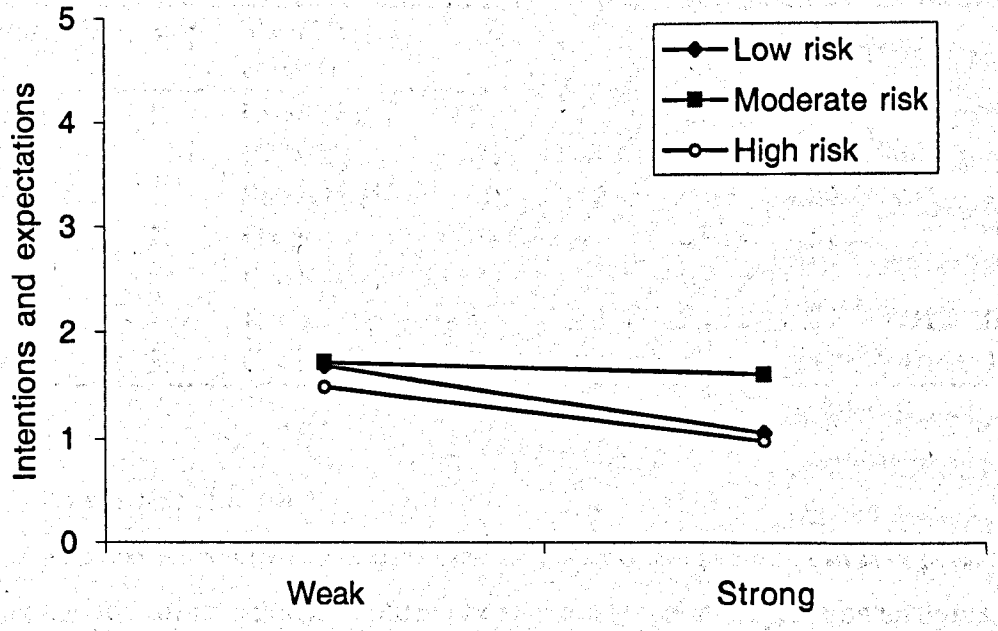

Figure 5.4. Interaction of level of risk and strength of article for reports of intentions and expectation to change among self-affirmed participants: Simple slopes for article strength at three levels of risk.

Table 5.11. *Moderated Regression Analysis for Measures of Intentions and Expectations.*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Intentions / expectation	1.	Condition(C)	.10	.14	.03	.47		
		Risk (R)	.04	.01	.19	<.001		
		Strength (S)	.11	.14	.03	.43	.04	8.42***
	2.	C x R	-.04	.02	-.08	.04		
		C x S	-.41	.27	-.06	.14		
		R x S	.02	.02	.04	.28	.05	5.39***
	3.	C x R x S	.09	.04	.10	.014	.06	5.51***

Note. ***$p < .001$

Mood

Hierarchical regression indicated that condition, level of risk, and strength, neither alone nor in combination predicted participants' mood after reading the health message (Table 5.12).

Table 5.12. *Moderated Regression Analysis for Reports of Explicit Mood*

Variable	Step	Variable entered	*B*	*SE*	β	*p*	R^2	*F*
Mood	1.	Condition(C)	-.02	.12	-.01	.89		
		Risk (R)	-.01	.01	-.07	.09		
		Strength (S)	-.12	.12	-.04	.30	.00	1.06
	2.	C x R	.01	.02	.03	.51		
		C x S	-.20	.23	-.03	.39		
		R x S	-.02	.02	-.04	.31	.01	0.82
	3.	C x R x S	.05	.03	.06	.12	.01	1.06

Self-esteem as a predictor

To test whether self-esteem acted as a significant predictor of risk perception in either the non-affirmed or self-affirmed conditions separate regression analyses were conducted. Data were analysed using three-step hierarchical regressions. At Step 1, main effects of strength, risk and self-esteem were entered. At Step 2, interactions of pairs of variables were entered, and at Step three the three-way interaction of Strength X Risk X Self-esteem. The variables were mean centred to aid interpretations. In the

non-affirmed condition, no effects involving self-esteem approached significance (main effect: $\beta = -.04$, $p = .45$). However, in the self-affirmed condition self-esteem did predict risk perceptions, $\beta = -.09$, $p = .049$. There were no other significant interactions involving self-esteem. Following Edwards (1984), the Betas in the non-affirmed and self-affirmed condition for self-esteem (e.g., non-affirmed, $\beta = -.04$; self-affirmed, $\beta = -.09$) and risk standing (e.g., non-affirmed, $\beta = .43$, $p < .001$; self-affirmed, $\beta = .38$, $p < .001$) were compared. Past drinking behaviour was found to be a stronger predictor of risk perceptions in the non-affirmed condition, $t(713) = 2.05$, $p < .05$, and self-esteem a stronger predictor in the self-affirmed condition, $t(713) = -5.33$, $p < .001$. Self-affirmed participants with higher levels of self-esteem reported lower risk perceptions, regardless of their risk standing. This finding suggests that in comparison to non-affirmed participants, self-affirmed participants based their risk judgements to a lesser extent on their level of alcohol consumption but more on their perceptions of self-worth.

Comparison with Study 1

Hierarchical regressions were conducted to examine whether there were differences between participants' responses to the health message in Study 1 and the strong version of the message in the present study. The following between-participant factors were included in the analysis: study (Study 1 vs. present study), condition (self-affirmed vs. non-affirmed), level of alcohol consumption. Data were analysed using three-step hierarchical regressions. At the first step, main effects of condition, study and risk were entered. At Step 2, interactions of pairs of variables were entered, and at Step three the final 3-way interaction of Condition X Study X Risk.

Analysis revealed a significant main effect of study for participants' belief in the link, $\beta = .38$, $p < .001$ and how persuasive they perceived the article to be in general, $\beta = .17$, $p = .001$. Participants in Study 1, regardless of condition or alcohol consumption, reported a greater belief in the link, and rated the article as more persuasive (Table 5.13). Analysis revealed there was no difference between the two studies in participants' ratings of evidence strength, $\beta = .05$, $p = .40$.

Table. 5.13. *Comparison of Impact of Health Leaflet on Measures of General Message Acceptance in Study 1 and Present Study.*

	Study 1	Present Study
Belief	4.71 (1.02)	3.45 (1.29)
General Persuasion	3.76 (1.18)	3.19 (1.42)
Evidence strength	3.49 (1.22)	3.30 (1.36)

Note. Higher values indicate greater belief, persuasion and ratings of evidence strength.

Analysis of participants' self risk perceptions revealed a three-way interaction of Condition X Study X Risk, $\beta = .13, p = .006$. Whereas in Study 1 there was a significant two-way interaction of Condition X Risk, $\beta = .29, p = .008$, such that self-affirmation in higher risk participants was associated with greater risk perceptions, in the present study there were both main effects of Risk, $\beta = .44, p < .001$, and Condition, $\beta = -.12, p = .016$. In the present study higher consumption of alcohol was associated with greater risk perceptions, while self-affirmation was associated with a reduction in risk perceptions. Self-affirmation had a different impact on those in Study 1 and the present study (Table 5.14).

Table. 5.14. *Comparison of Impact of Health Leaflet on Risk Perceptions in Study 1 and Present Study.*

	Study 1		Present Study	
	SA	NA	SA	NA
Self Risk	3.65 (1.80)	2.98 (1.77)	2.68 (1.99)	3.05 (2.15)

Note. Higher values indicate greater risk perceptions.

Discussion

The results of the present study suggest that self-affirmation did not increase general or personal message acceptance, but instead was associated with less persuasion and sensitivity to message strength. Self-affirmed participants at high and low levels of risk rated both the strong and weak messages article as less persuasive in terms of getting women to reduce their alcohol consumption. Regardless of level of risk, self-affirmed participants showed less differentiation of message strength, compared to those who were non-affirmed. Furthermore, while non-affirmed

participants' risk judgements were sensitive to the strength of the message, self-affirmed participants were not. Non-affirmed participants' intentions and expectations to change were also sensitive to the strength of the message, with the stronger message producing greater intentions and expectations to change. However, in the self-affirmed condition, strength of the message had no effect on moderate drinkers intentions, and for those at high and low risk the stronger message actually produced marginally weaker intentions and expectations to change.

The data for participants at higher levels of risk suggest that self-affirmation led to less sensitivity to the strength of the message, indicating they may have engaged in less elaborative processing than those who were non-affirmed. For self-affirmed participants, the stronger message actually elicited poorer outcomes (intentions and expectations of change), suggesting that they may have reacted more defensively than those in the non-affirmed condition. These findings are contrary to those in Study 1, in which self-affirmation had little effect on measures of general persuasion, but promoted acceptance of personal relevance of the message. The present findings lend support to research suggesting that self-affirmation techniques may not always have positive consequences for processing health threats (Boney-McCoy et al. 1999; Klein et al, 2001; Reed & Aspinwall, 1998).

The present study replicated the findings of Klein et al. (2001), suggesting that compared to non-affirmed participants, those who were self-affirmed based their risk judgments more on their level of self-esteem, and less on their drinking behaviour. This finding is consistent with self-affirmation leading to more deductive (top-down) processing. Klein et al. (2001) argue that high cognitive load could lead to less inductive self-judgements. Just as research suggests positive mood reduces cognitive capacity and leads to less elaborate processing of the persuasive messages (Bless et al., 1990; Mackie & Worth, 1989), self-affirmation in the present setting may have reduced people's capacity to process the information, leading to less sensitivity to the argument strength and less inductive self-judgments. Consistent with previous findings in this thesis, self-affirmation was not found to boost participants' positive mood, suggesting that although self-affirmation may act at times in a similar manner to mood, its effects are not mediated by mood. Unlike Klein et al., the present study also found less inductive processing and less sensitivity to the message in both higher and lower

risk self-affirmed participants. In the present study, however, even those at lower risk may have found the message somewhat threatening even though they only drank alcohol at relatively low levels.

The impact of self-affirmation on those at lower levels of risk also raises an interesting question about the effects of self-affirmation. The participants at lower levels of risk showed a similar pattern to those at higher levels of risk, reporting reduced persuasion, weaker intentions and expectations to change following the stronger message, while also showing less sensitivity to the strength of the message in their risk perceptions and rating of the evidence. Study 1 also provided some evidence consistent with this pattern with self-affirmation reducing negative affect and perceptions of risk not associated with the message in lower risk participants. These findings suggest that self-affirmation may reduce cognitive capacity and elaborative processing in the lower risk participants.

For moderate drinkers, self-affirmation also reduced sensitivity to the strength of the message when reporting risk perceptions and rating the strength of the evidence. However, moderate drinkers' level of persuasion was not reduced by self-affirmation, and intentions and expectations were not affected aversely by message strength. This suggests that for moderate drinkers who were potentially more involved with the message than those at low risk, but presumably had less motivation to be defensive than those at high risk, self-affirmation had slightly less negative effects.

Comparison of Study 1 and 4

Comparison of the data from Study 1 and 4 revealed that, regardless of condition or alcohol consumption, participants in the present study saw the article as less persuasive and reported a reduced belief in the link between alcohol and breast cancer. Furthermore, self-affirmation had different effects on risk perceptions, promoting acceptance of risk among those at higher risk in Study 1 and reducing risk perceptions, regardless of level of risk, in the present study.

There are various possible explanations that may help account for differences between the findings of the two studies, including the mode of communication and the sample used. Running an experiment in a laboratory setting has a variety of differences from conducting research over the Internet. The Internet has various advantages, such as providing a straightforward means of recruiting a large, non-student sample.

However, the Internet provides less controlled conditions with no guarantees of under what circumstances participants completed the experiment. Participants on the Internet have been argued to invest less time in completing studies (Kraut et al., 2003), though others have argued that Internet participants may be more motivated than undergraduate participants (Birnbaum, 2004). A review of 9 studies run both on the Internet and in laboratory settings suggests that there is often little difference between the findings of the studies (Krantz & Dalal, 2000), whereas other research has identified a variety of differences between laboratory and on-line completion of psychological studies, which could have implications for the present study.

Murphy, Long, Holleran, & Esterly (2003) investigated the impact of persuasive messages on paper or on-line, and found that an identical message was rated as more difficult to understand, less credible, and less persuasive when on-line than when on a paper. Based on Murphy et al.'s research the difference between the findings of Study 1 and the present study could reflect the mode of communication, such that participants in Study 1 found the message more persuasive because it was on paper as opposed to a computer.

Another possible difference between the two modes is that the Internet provides more anonymity. Anonymity in Internet-based studies has been found to be associated with less social desirability in responding (Joinson, 1999), although this is not always the case (Knapp & Kirk, 2003). The use of the Internet in the present study may have led participants to feel they could respond more honestly. Differences could reflect reduced demand characteristics in responses of those taking part over the Internet, leading to the article being rated as less persuasive. In a laboratory setting participants may feel a greater demand to accept the message and rate the article positively because the experimenter, who may appear to have a vested interest in the article, is present. This could account for why participants in the present study reported being less persuaded by the message. However, this explanation does not explain why self-affirmation had conflicting effects in Studies 1 and 5. Participants in Study 1 reported being naïve to the true nature of the self-affirmation task, indicating that the findings of Study 1 are unlikely to be due to participants responding in a manner in which they believed was desired.

Another explanation for the differences between the two studies could be the samples recruited. The sample in the present study were older than those in Study 1. Older women's perceptions of risk of breast cancer are likely to significantly differ from those of young women. Indeed, younger women are more likely to overestimate their life-time risk of breast cancer, compared to older women (Herbert-Croteau, Goggin, & Kishchuk, 1997; Lermen, Kash, & Stefanek, 1994). Though older women are actually at greater risk of breast cancer, their perceptions of factors that might contribute to the disease may differ from that of younger women, such that the risk associated with alcohol may seem less significant. Furthermore, for older women, as the health message itself points out, there may be greater protective benefits of alcohol, for example against heart disease. These older women may have been better equipped to counter-argue the message, for example, recruiting information about the benefits of drinking alcohol. Perhaps when a message is easily counter-argued and minimised, self-affirmation does not provide the most direct route to restore self-integrity, and regardless of self-affirmational status participants chose to defend against the message. This explanation, however, does not in itself explain why self-affirmation in the present study may have led to more biased and deductive processing than in the non-affirmed condition. If both non-affirmed and self-affirmed participants in the present study counter-argued the message and engaged in biased processing, why did self-affirmed participants do this to a greater extent?

Raghunathan and Trope (2002) offer one possible explanation. Raghunathan and Trope conducted research examining the effects of positive mood on acceptance of health communication. Their findings suggest that, when a message has personal implications with long-term benefits, positive mood can reduce biased processing. However, if a message is perceived to have no long-term benefits, mood acts as information, with a positive mood serving to indicate well-being, and this leads to a reduction in elaborative processing. Raghunathan and Trope suggest that boosts to self-esteem may act in the same way, such that only when health information is perceived to have long-term benefits will self-affirmation reduce biased processing. If health information is perceived to have no long-term benefits self-affirmation may act as information, reassuring participants and leading to greater biased processing. In the present study, the message may have been perceived to have fewer long-term benefits

for the older sample. For example, they may have perceived their risk of breast cancer to be greater from sources other than alcohol, or there to be greater benefits from drinking alcohol. If this were the case, in the present study, self-affirmation may have signalled well-being and reduced elaborative processing. This could explain why self-affirmation resulted in reduced differentiation of weak and strong arguments, and why, in comparison to controls, self-affirmed participants reported reduced persuasion and risk perceptions.

An additional account of what might moderate the effectiveness of self-affirmation is that the older women perceived themselves as having less self-efficacy to reduce their drinking behaviour. For younger women, the target of reducing their alcohol consumption in the next couple of years may have appeared feasible. The younger women were in the early years of university and their drinking habits may have been viewed as short-term behaviour that they planned to reduce on leaving. In fact many of the women debriefed in Study 1 reported that they planned to reduce their alcohol consumption after finishing university. For older women, whose drinking patterns are likely to be more established, the target of reducing their alcohol consumption could have appeared less achievable. When presented with a health message targeting an integral and well-established behaviour, the self-affirmation manipulation may not have been strong enough to overcome the threat, leading to participants seeking other ways to reduce it, for example, by directly denying or rationalising the health threat. In this case the positive self-beliefs that were salient may have acted as information, leading to feelings of invulnerability and signalling no action was needed to deal with the threat.

According to these two accounts (e.g., fewer long-term benefits of information and less self-efficacy) non-affirmed participants in the present study should also show a reduction in persuasion in comparison to non-affirmed women in Study 1. For example, models of processing fear appeals suggest that, when coping appraisals are low, and threat appraisals are high, message rejection is more likely to occur (Witte, 1992). Thus, for non-affirmed participants in the present study, if their coping appraisals were lower than those in Study 1, they should have reported reduced persuasion. There was some evidence to support this, with non-affirmed participants in the present study reporting reduced persuasion on measures of general message

acceptance. Examination of participants' risk perceptions, however, indicated that the non-affirmed participants did not differ in their likelihood judgements for experiencing breast cancer as a result of drinking alcohol. Clearly further research is needed to establish what factors may moderate the effectiveness of self-affirmation.

Present literature

Since undertaking the present study, Correll, Spencer, and Zanna (2003) have published a study also examining the effects of self-affirmation on the processing of weak and strong arguments, aiming to investigate whether self-affirmation increased the acceptance of counter-attitudinal information, not by increasing objectivity, but by promoting agreeableness or trivialisation. Correll et al. presented students with a debate for and against increases in tuition fees, with both positions putting forward weak and strong arguments. Participants who had previously reported being opposed to tuition increases were recruited to the study, and the level of attitude importance was also measured. Correll et al. found that self-affirmed participants, for whom the issue was personally important, reported being more persuaded by strong as opposed to weak arguments. In contrast, non- affirmed participants did not rate strong arguments as being any more persuasive than weak ones. For those who reported low involvement with the issue, self-affirmation had little effect, with participants in both conditions rating the strong arguments as stronger than the weak ones.

Clearly the findings of Correll et al. contradict those of the present study and suggest that, in some circumstances, self-affirmation appears to promote elaborative processing. One factor that may account for the differences between the findings of the two studies could be the threat used. Providing participants with information contrary to their attitudes on tuition fees may have not provided as strong a threat to self-integrity as information about the personal risk of breast cancer. Furthermore, participants in Correll's study may have found it easier to change their beliefs about tuition fees than it was for women in the present study to accept their need to change a complex behaviour such as drinking. Thus the differences in the findings between the two studies could reflect the centrality of the threat and the ease with which participants could change their attitudes or behaviour.

Limitations of present research

One possible explanation for the differences between the present study's findings and those of Study 1 could be differences in women's perceptions of their ability to change their drinking behaviour. However, no measures were taken of perceptions of self or response efficacy and whether these variables predicted outcomes differently for non-affirmed and self-affirmed participants. Study 5 therefore includes measures of coping appraisals to examine whether these might moderate the effects of self-affirmation. Furthermore, in the present study no measures of women's past alcohol use were taken. Though women reported on their typical alcohol consumption, participants may have been high alcohol drinkers in the past, and perceptions of their past use may have influenced their message processing. In addition no measures were taken of whether participants were already intending to change their alcohol consumption, and whether this influenced the effects of self-affirmation. Study 5 includes a measure of stage of change to examine whether this variable might moderate the effects of self-affirmation.

A further limitation of the present study is that only a limited number of measures of affective reactions were included. Study 5 includes both self-reports of affect experienced while reading a relevant health message and reports of worry after reading the message. Study 5 also includes measures of self-related negative affect to measure the consequences of self-affirmation more specifically on negative affect related to the self.

Summary

In comparison to Study 1 women in the present study were less persuaded by a message outlining the risks alcohol for breast cancer. The present study provides evidence that self-affirmation is not always associated with a reduction in biased processing. Consistent with Klein et al. (2001), self-affirmation appeared to be associated with less inductive processing. Further research is needed to establish what factors might moderate the effectiveness of self-affirmation.

The final study replicates Study 1, using a non-novel health message that aimed to promote adopting a healthy behaviour rather than refraining from an unhealthy behaviour. The health information chosen was the 5-a-day fruit and vegetables message. Diet, including the consumption of fruit and vegetables, is highlighted as a key issue in the NHS Plan (Department of Health, 2000), with evidence that increasing consumption of fruit and vegetables would reduce the risk of diseases such as heart disease, stroke and cancer by around 20%. Currently, these diseases account for 60% of early deaths in the UK (Cullum, 2003). Targeting the dietary habits of 18 to 24 year olds is particularly important, not only because this a period of transition from adolescence to adulthood, which for many involves new control and responsibility of their own diet (Ma, Betts, Horacek, Georgiou, & White, 2003), but also because this group shows poor dietary choices. For example, younger adults have the poorest level of fruit and vegetables consumption among UK adults (Henderson, Gregory, & Swan, 2002; Hoare et al., 2004).

Fear appeals and self-affirmation

Models of how people process health messages, such as the Extended Parallel Process Model (EPPM, Witte, 1992, 1994, 2000) and Protection Motivation Theory (PMT, Rogers, 1975) suggest that there are a number of cognitive variables that determine whether a health message is effective in persuading an at-risk participant to change behaviour. Both the EPPM and PMT highlight the role of threat and coping appraisals. Threat appraisals are a combination of perceptions of severity and vulnerability (Rogers, 1975; Witte, 2000). Coping appraisals include perceptions of self- and response-efficacy (Rogers, 1975; Witte, 2000). Rogers (1983) also argues that the perceived rewards of the maladaptive behaviour and costs of the adaptive behaviour are further mediating variables.

As outlined in Chapter 1, Witte (2000) proposes that the arousal of fear associated with a health message can motivate biased responding (see also Hovland et al., 1953; Janis, 1967; McGuire, 1969). Witte (1992) suggests that when perceptions of threat (vulnerability and severity) are high, people experience fear, the arousal of which motivates appraisals of self- and response-efficacy. If both coping and threat

appraisals are high, *danger control* should be initiated, with people generating adaptive responses to directly reduce the danger (e.g., by accepting the message and deciding to change a risky behaviour). However, if threat appraisals are high, but coping appraisals are low, *fear control* should be initiated, with people generating defensive responses to reduce the threat without reducing the danger. PMT also predicts an interaction of threat and coping appraisals, such that high threat appraisals but low coping appraisals should be associated with message rejection and biased processing and rationalisation. However, evidence has only somewhat supported this proposed interaction. In Rogers & Prentice-Dunn's (1997) review of PMT research they found evidence for an interaction in only half the studies they examined.

What does self-affirmation theory predict about the roles of variables such as coping and threat appraisals? In non-affirmed participants these variables will still play an important role in whether a message is accepted or rejected. According to self-affirmation theory, when health information threatens self-integrity, participants will select the most accessible route to reduce this threat (Steele, 1988). If threat and coping appraisals are both high this may lead to acceptance of the message and changing behaviour. If coping appraisals are low, however, this may lead to engaging in other processes to restore self-integrity, such as denial or avoidance of the message (as models such as EPPM and PMT suggest). However, if a person is self-affirmed, they have a direct route by which to restore self-integrity, and accept the message. In this case, coping appraisals should be less predictive of whether a message is accepted or not. Put differently, self-affirmation theory suggests that people reject a message when threat appraisals are high and coping appraisals are low because changing their behaviour is not an accessible route to restoring self-integrity. For self-affirmed participants, self-integrity has been restored allowing participants to accept the message, regardless of their coping appraisals.

Using EPPM and PMT, alternative predictions could also be made about the mechanisms of self-affirmation. For instance, self-affirmation may work by boosting coping appraisals, threat perceptions, or influencing the level of negative affect experienced. Study 1 tested whether self-affirmation increased perceptions of self-efficacy. Though there was a significant interaction of condition and risk, the increase in self-efficacy in higher risk, self-affirmed participants was not significant, indicating

that at best self-affirmation had only a marginal effect on perceptions of self-efficacy. Reed and Aspinwall (1998) measured participants' perceptions of perceived behavioural control (PBC), and found that higher risk, self-affirmed participants reported greater PBC in comparison to non-affirmed participants. However, this increase in PBC was not translated into an increase in intentions or changes in health behaviour. In fact higher risk, self-affirmed participants in Reed and Aspinwall's study reported lower intentions to change. Further tests are needed to assess whether self-affirmation does influence self-efficacy, and whether self-efficacy is less predictive of message acceptance in self-affirmed participants.

Threat appraisals may also provide a possible mediator of the effects of self-affirmation. Both Sherman et al. (2000) and Study 1 demonstrated that higher risk, self-affirmed participants reported higher risk perceptions than those who were non-affirmed. However, Study 1 also demonstrated that the increase in risk perceptions did not mediate the effects of self-affirmation on intentions to change. Models such as EPPM and PMT indicate that increases in threat appraisals alone are not sufficient to increase message acceptance, but rather the interaction of threat and coping appraisals predicts message acceptance. Further tests are needed to establish whether self-affirmation influences the impact of the interaction of threat and coping appraisals on message acceptance.

The impact of self-affirmation on negative affect was also examined in Study 1. Higher risk, self-affirmed participants reported experiencing higher levels of negative affect. This finding could reflect the fact that those who were non-affirmed engaged in more fear control. Self-affirmation theory predicts that people are motivated to defensively process a message, not to reduce fear but because the health message poses a threat to a participant's positive experience of the self. However, little research has directly examined whether health messages have consequences for negative self-feelings (e.g., shame, disappointment, inadequacy) as well as fear, or whether these self-related, negative affective states predict message acceptance. Dillard and Peck (2000) measured the impact of a range of health messages on affective reactions, including anger, fear, surprise, sadness, happiness and guilt, and found evidence that, for at least two of their eight health messages, guilt significantly predicted message acceptance. Increased levels of guilt were associated with increases

in message acceptance. Furthermore, guilt had distinctive effects from fear, suggesting that these affective states contribute uniquely to predicting message acceptance. Witte and Allen (2000) also recognise that health messages have affective consequences other than fear, such as irritation, tension, and increased anxiety. Leventhal and Trembly (1968) also identified disgust and feelings of impotence as affective consequences of negative health messages. The relationship between these affective responses and message acceptance is unclear (Witte et al., 2000). Further research is needed to test self-affirmation theory's prediction that negative and personally-relevant health messages are associated with negative self-feeling and to test whether changes in this variable might mediate the effects of self-affirmation.

Message novelty

The use of health campaigns means people are regularly presented with health messages that are not novel. For instance, the government campaign to encourage people to quit smoking means that many smokers will have been exposed to information outlining the risks associated with smoking many times. However, empirically, research examining defensive processing has tended to focus on the use of novel health threats (Ditto & Lopez, 1992; Kunda, 1987; Liberman & Chaiken, 1992). Using novel health messages has the benefit of controlling for the prior beliefs people have about the risk behaviour targeted, thus controlling for alternative accounts for biases in processing (Kunda, 1990). Nevertheless, to establish the practical importance of self-affirmation as a technique of reducing biased processing of health messages, research is needed to examine its effects on well-established health messages.

Targeting an established health risk has been argued to provide a different challenge to that of a novel threat (Johnson, 1994). For instance, there is evidence that prior knowledge reduces the persuasiveness of a message (Janis & Feshbach, 1953), presumably because "non-attitudes" (e.g., holding no strong beliefs either way about an issue) are easier to change than pre-existing attitudes (Johnson, 1994). Furthermore, participants who have already been presented with a negative and relevant health message, but have not changed their behaviour, may have already engaged in processes such as rationalisation of the threat (e.g., "I don't need to change my behaviour because... I am healthy in general / I'm too young to get ill / I'll do something about it when I have more time"). These established rationalisations may

make further exposure to the health message ineffective. For instance Buunk and Dijkstra (2001) found that people at high risk of HIV did not deny they were at risk, but had rationalised their behaviour (e.g., believed the risk was exaggerated by the media, or that their partner was probably not infected). Thus, Buunk and Dijkstra, (2001) argue that further health information about their risks would be less effective at changing behaviour, than for example an intervention targeting pre-existing rationalisations. Stage models of health behaviours, such as the Precaution Adoption Process Model (Weinstein, 1988; Weinstein & Sandman, 1992), also suggest that an intervention should be matched to a person's stage of behaviour change. For example, one message may be effective for those who are unaware of their risks, but not for those who are aware but have currently decided not to change (Weinstein, Rothman, & Sutton, 1998).

Can self-affirmation influence acceptance of an established health risk? There has only been one direct test of the effects of self-affirmation on an established health message. Sherman et al. (2000) provided participants with information about the risks of HIV. Although Sherman et al. did not explicitly measure participants' past knowledge of the risks of HIV and AIDS, college students have been found to have a relatively high knowledge of the risks (Shapiro, Radecki, Charchian, & Josephson, 1999). Sherman et al. found self-affirmation promoted message acceptance for an established health-risk, with self-affirmed participants reporting greater perceived personal risk and engaging in more AIDS preventative behaviours. In a further study, Sherman et al. (2000) also demonstrated that self-affirming participants, after they had already read a health message, promoted message acceptance in terms of beliefs, risk perceptions and intentions. Thus self-affirmation appeared to allow participants to reappraise the health message at least very shortly after it had been originally processed. Clearly further tests of the effects of self-affirmation on the processing of established health-risk information are needed.

Current Study

The previous studies in this thesis have examined whether self-affirmation reduces biased processing and have provided evidence that sometimes, but not always (Study 4), self-affirmation can reduce biases in participants' response to a health message. For instance, self-affirmation was found to reduce avoidance of personal

inferences (Study 1) and attentional avoidance (Study 3). The current study aimed to extend the findings of these previous studies by testing the effects of self-affirmation on biased processing using models from the fear appeal literature, including the EPPM and PMT. By measuring the variables implicated by the EPPM and PMT as being important for message acceptance it is possible to test two alternative mechanisms by which self-affirmation may act. Examining whether the effects of self-affirmation are mediated by changes in for example, threat appraisals, coping appraisals or fear, or alternatively, as Steele's theory suggests self-affirmation works independently of these processes and acts to restore self-integrity, reducing defence motivation and directly impacting upon message acceptance. By including measures of negative self-feeling as well as fear it is also possible to test whether these variables predict message acceptance. The present study will examine whether the role of these variables differs for non-affirmed and self-affirmed participants.

The current study aimed to investigate whether self-affirmation could increase message acceptance of a well-established health threat by providing participants with a health message outlining the negative health consequences of not regularly eating 5 portions of fruit and vegetables a day. As with Study 1 and 3, the present study also included measures of risk perceptions (for self and average other), worry, ease of imagination, beliefs about the message, mood and self-esteem. By including these measures it is possible to compare the effects of self-affirmation on novel health messages that aimed to reduce an unhealthy behaviour, with the effects for an established health message that promoted adopting a healthy behaviour. Following Rogers (1983), further cognitive measures assessing participants' perceptions of the costs and benefits associated with eating more fruit and vegetables were also included.

Pilot Study

To examine whether participants did report negative self-feeling as a result of receiving a negative and self-relevant health message, and to develop items to measure negative self-feeling, a pilot study was conducted. Participants consisted of 32 male and 49 female university undergraduates and postgraduates who were recruited from around the university campus (mean age = 20.3 years). Participants were recruited to take part in a study examining reactions to health information. Participants were instructed to: "think of a recent time when you were told (for example, by a doctor,

nurse, the media, friends) that by doing or not doing something you *personally* were risking damage to your health. For example, being told that you should cut down the amount of alcohol you drink, or eat less high fat food to prevent damaging your body and health, or that you need to exercise more regularly, and eat more fruit and vegetables to prevent illness and stay healthy." Participants were asked to briefly describe the information that they received, and then "take a couple of seconds to think about how you felt when you received this information". Participants were then presented with a list of 52 adjectives. These comprised measures of: fear (frightened, tense, nervous, anxious, uncomfortable, nauseous, taken from Rippetoe & Rogers, 1987); sadness (sad, upset, generated for this study); negative self-feeling (disappointed with self, annoyed with self, guilty, self-critical, angry towards self, dissatisfied with self, disgusted with self, embarrassed, and shame, all taken from Elliot & Devine, 1994, with the additional items of humiliated, inadequate, inept, pathetic, immature, failure, useless, stupid, foolish, taken from Mathews, Mogg, Kentish, & Eysenck, 1995); discomfort (uncomfortable, uneasy, bothered, taken from Elliot & Devine, 1994); positive affect (good, happy, optimistic, friendly, energetic, Elliot & Devine, 1994); control (capable, in control, generated for this study); loss of control (uncertain, helpless, generated for this study); irritation (irritated, annoyed, angry, generated for this study) and some filler items (enlightened, peaceful, restless, calm, bored, motivated, curious, defensive, small, reassured, interested, tired, generated for this study). Participants were asked how the health information made them feel, and they responded to each item on 9-point scales, *not at all* (0) to *very much* (8). The order of the adjectives was counter-balanced using a Latin square.

Participants also completed two measures to assess whether health was an important personal value, "How important TO YOU is it to be healthy and free from disease?", and "How important TO YOU is it to engage in activities to promote health and prevent illness (e.g., safe sex, take exercise, eat healthily). Both items were measured on 7-point scales, *not at all* (0) to *extremely important* (6).

Table 6.1 presents the main categories of health risks participants reported thinking about. Of the pieces of health information participants had recently been exposed to, diet was most frequently reported.

Table 6.1. *Health Information Participants Reported Being Exposed To Recently*

Health Information	*N*[a]
Diet	25
Alcohol	23
Exercise	7
Smoking	9
Teeth	11
Other (e.g., safe sex, vaccinations)	6

Note. [a]Number of participants reporting exposure to each type of health information.

The mean responses to adjectives listed were calculated to examine which items participants responded to most strongly. The data for the 10 most frequent responses are in Table 6.2, along with the number of participants who reported experiencing each emotion to some extent (e.g., provided response greater than 0 [*not at all*]).

Table 6.2. *Affective Responses Most Frequently Reported in Response to Health-Risk Information.*

Item	Mean	*N*[a]
Self-critical	3.00 (2.25)	65
Bothered	2.71 (2.33)	60
Irritated	2.67 (2.62)	59
In control	2.60 (2.35)	62
Guilty	2.53 (2.33)	56
Annoyed with self	2.52 (2.43)	54
Disappointed with self	2.51 (2.27)	60
Capable	2.27 (2.26)	55
Uncertain	2.23 (2.32)	53
Optimistic	1.86 (2.12)	49

Note. Standard deviations in parentheses. [a]Number of participants reporting experiencing affective response.

When recalling their reactions to personally-relevant health information participants reported a range of affective responses, including negative self-feelings, discomfort, uncertainty, as well as positive responses such as a sense of control and optimism. Interestingly, items measuring fear were not among the strongest affective responses reported. Consistent with the assumption that health threats act as threats to people's positive experience of themselves, negative self-feelings such as feeling self-critical and disappointed with the self were among the emotions most commonly reported. Three items were selected to measure negative self-feeling from those scoring most highly and most commonly, (feeling self-critical, being annoyed with the self and disappointed with the self, $\alpha = .84$).

Analysis of the two items examining whether participants reported health to be an important value revealed that participants thought it was very important to be healthy ($M = 5.34$, $SD = .93$) and to engage in activities to maintain health ($M = 4.98$, $SD = 1.10$). This finding supports past claims that people value health (Croyle et al., 1997; Giner-Sorolla & Chaiken, 1997).

Study 5

Method

Participants

Female ($n = 73$) and Male ($n = 7$) psychology undergraduates were recruited to the study for course credit (mean age = 19.1 years). Of the sample, 55% lived in catered student halls, 43.8% lived in self-catering flats or private houses, and 1.3% lived at home with parents. All participants reported that they did not regularly eat 5 portions of fruit and vegetables each day.

Procedure

Upon arriving at the laboratory participants were informed that they would be completing two studies, including a writing task (self-affirmation / control task), a reading task (health message), and a questionnaire. Firstly, participants gave their age, year of study, and type of accommodation, and were asked to verbally recall everything they had eaten the previous day. The experimenter asked participants if the food recalled was typical of what they might eat on a normal day, and if not to explain why. Participants' fruit juice intake was also recorded. Participants were then asked to think about just the fruit and vegetables they had eaten the day before, and whether this

was typical of their normal intake. If it was not, they were asked to describe a more typical day. The experimenter then calculated the number of portions of fruit and vegetables that the participant had consumed the previous day, asking for further portion size information where necessary. The experimenter then estimated their intake on a typical day. (All the participants who took part in the study reported eating less then 5 portions of fruit and vegetables a day.) The participant was informed of their intake, and the experimenter indicated that she would record that the participant was not eating 5 portions of fruit and vegetables regularly each day. The participant was asked to confirm whether they agreed with this statement; all participants did so.

Participants were then told that one of the experiments would be investigating people's knowledge of the 5-a-day message. The experimenter explained briefly what the 5-a-day message was and highlighted the fact that people should be eating at least 5 portions of a variety of fruits and vegetables each day. The experimenter stressed that this should be an activity that people do everyday, such as brushing one's teeth, and that 5 portions should be a minimum.

The experimenter then instructed participants to work through the three tasks, starting with a writing task (self-affirmation / control task). The experimenter stressed that this task was part of a separate project examining student values that she was handing out on behalf of her supervisor. The experimenter was blind to experimental condition. Participants were told that, after spending at least 5 minutes on the first task, they should move on to the second study. The materials for the second study were placed in labelled envelopes and the participants first completed the reading task and then the questionnaire. The experimenter checked that the participants were clear on what tasks they were to complete and the order in which to do so, before leaving the room. The experimenter monitored the participants from outside the room, and where necessary re-entered to remind participants to move on to the next task after 10 minutes.

After the study was complete, the experimenter told participants that she had some leaflets with information on portion sizes and tips for eating 5-a-day, and that they were welcome to help themselves to these. She also offered participants a token, which they could exchange for a piece of fresh fruit, from another room in the building. The experimenter left the room ostensibly to retrieve a slip to confirm the

participant had completed the study. Participants were left alone for approximately 10 seconds to decide whether to help themselves to leaflets or a token. After the participants had left, the experimenter noted whether participants had taken leaflets or a token, which had been discreetly labelled. By labelling the tokens it was also possible to examine which tokens were later redeemed.

Materials

Non-affirmation / Self-affirmation condition. Participants completed the values affirmation and control tasks described in Study 1 (Appendix A).

Health message. The article was entitled "The health benefits of fruits and vegetables" and was taken from UK government information about the 5-a-day health message (Department of Health, 2003). The article was designed to resemble government information available on the Internet (Appendix J). All statements were true and it was around 450 words in length. The article described the benefits of regularly eating 5 portions of fruit and vegetables everyday, for example for reducing the risk of heart disease, strokes and some cancers. The article also briefly explained why fruit and vegetables hold such health benefits. The article emphasised that people should eat at least 5 portions of a variety of fruit and vegetables each day.

Post-manipulation measures. Instructions informed participants that they would be asked about the health information they had read and their thoughts about eating at least 5 portions of fruit and vegetables each day. Participants were also reminded that the 5-a-day message is to eat at least 5 portions (400g) of a variety of fruit and vegetables each day. All items were measured on 7-point scales unless otherwise stated (anchored at 0 and 6). The dependent measures were intermixed with a number of filler items such as, for example, "The article explained the benefits of eating a healthy diet well" (*strongly disagree / strongly agree*).

Threat Appraisals. Participants were asked "How serious are the health consequences of not eating at least 5 portions of fruit and vegetables each day?" (*not at all serious / very serious*). Participants also indicated how vulnerable they were of experiencing the negative consequences of a poor diet, "My chances of experiencing heart disease and some cancers in the future if I do not eat at least 5 portions of fruit and vegetables each day are..." (*very low / very high*), "How likely is it that you will experience poor health in the future if you do not eat at least 5 portions of fruit or

vegetables each day?" (*not at all likely/ very likely*). These three items were averaged to form the *threat appraisal* measure and analysed as a single item ($\alpha = 0.77$).

Coping Appraisals. Participants completed two measures of *response efficacy* ("Eating at least 5 portions of fruit and vegetables each day will reduce my risk of heart disease and some cancers", "If I were to eat at least 5 portions of fruit and vegetables each day I would reduce my risk of heart disease and some cancers", *strongly disagree* [0] / *strongly agree* [6]). Participants also completed a 6-item *self-efficacy* scale for eating fruit and vegetables, adapted from Fuchs, Leppin, Schwarzer and Wegner's (1993; cited in Schwarzer, 1993) self-efficacy towards healthy eating behaviour scale. The scale included the following items in sequence: "I know for sure that I could adhere to eating at least 5 fruit and vegetables each day if I really wanted to.", "If I intend to take up eating at least 5 fruit and vegetables each day, I know that I can stick to it", "I doubt that I could manage to really carry through eating at least 5 fruit and vegetables each day.", "I feel that I am unable to muster up the patience necessary for eating at least 5 fruit and vegetables each day.", "I could usually resist the temptation of delicious, but unhealthy food.", "I could take the time necessary for shopping for fresh and healthy groceries.", (*Not at all true* [1] / *Barely true / Moderately true / Exactly true* [4]). Items 3 and 4 of the self-efficacy scale were reverse coded. As the response-efficacy and self-efficacy scales were measured on different scales, z-scores were calculated to combine the measures and the 8 *coping appraisal* items were analysed as a single item.

Optimistic bias. Participants completed two *risk perception* items to assess any optimistic bias. The two items were counterbalanced. Participants were asked: "How likely is it that you will experience poor health from your current intake of fruit and vegetables?", "How likely is it that the average student of your age and sex will experience poor health from their current intake of fruit and vegetables?" Responses were given on an 11-point scale, *not at all likely* (0) to *very likely* (10).

Beliefs. Participants were asked about their *beliefs* about not eating enough fruit and vegetables, "If I don't eat at least 5 portions of fruit and vegetables each day it will have negative effects for my health." (*strongly disagree / strongly agree*). Participants' beliefs about the relevance of the message were measured using the item, "I need to eat more fruit and vegetables", (*strongly disagree / strongly agree*).

Negative affect. Participants completed 4 items measuring *negative affect* experienced while reading the health message. For example, "How much did the article make you feel tense?", "How much did the article make you feel nervous?", "How much did the article make you feel uncomfortable?" (*not at all / very much*). Apart from the fourth item, "I felt fearful while reading the article", (*strongly disagree / strongly agree*), the measures were taken from Witte (2004). The four items were averaged and analysed as a single item ($\alpha = .92$). Three further items were included to measure participants' reports of *worry* after reading the article ("I am worried that I am not currently eating enough fruit and vegetables", "I worry about my current level of consumption of fruit and vegetables", "I worry about the consequences of not eating at least 5 portions of fruit and vegetables each day", *strongly disagree / strongly agree.* $\alpha = .79$).

Negative self-feeling. The impact of the message on *negative self-feelings* was measured using 3 items, "How much did the article make you feel disappointed with yourself?", "How much did the article make you feel self-critical?", and "How much did the article make you feel annoyed with yourself?", (*not at all / very much*). The items were averaged and analysed as a single item ($\alpha = .90$).

Costs and benefits. Five items were included to measure perceptions of the costs associated with eating 5 portions of fruit and vegetables and the benefits of eating less healthy options. These items were based on the literature on the perceived costs and benefits of eating 5-a-day (John & Ziebland, 2004; Ziebland, Thorogood, Yugkin, Jones, & Coulter, 1998). For example, "The alternatives to fruit and vegetables are less expensive.", "I find fruit and vegetables less enjoyable than other options.", (*strongly disagree / strongly agree*). These items were averaged and analysed as a single item of *costs* of eating and *benefits* of not eating 5-a-day ($\alpha = .71$).

Intentions. Intentions to eat at least 5 portions of fruit and vegetables each day for the next 7 days were measured by two items, "I intend to eat at least 5 portions of fruit and vegetables each day, in the next 7 days" and "Do you intend to eat at least 5 portions of fruit and vegetables each day in the next 7 days?", *definitely do not intend to / definitely intend to.* The items were averaged and analysed as a single item, $r(80) = .88, p < .001$.

Ease of imagination. A measure of *ease of imagination* was included, "How easy is it for you to imagine yourself experiencing poor health as a result of your current intake of fruit and vegetables" (*not at all easy [0], slightly easy, quite easy, moderately easy, very easy, extremely easy [5]*).

Thoughts about change. Participants were presented with the following statement and response options, "Before today, I had thought about eating at least 5 portions of fruit and vegetables a day, and decided to make this change..." *at no point in the future / in 10 years time / in 5 years time / in 2 years time / in the next year / in the next 6 months / in the next 2 months / in the next month / in the next week / I have already made this change / never thought about it* (anchored at 0 and 10).

Stage of change. To assess stage of change (Prochaska & DiClemente, 1982) participants were also asked to read each of the following statements and indicate their current view: "I currently do not eat at least 5 portions of fruit and vegetables each day and I do not intend to start in the next 6 months.", "I currently do not eat at least 5 portions of fruit and vegetables each day but am thinking about starting doing so within the next 6 months.", "I currently eat at least 5 portions of fruit and vegetables some days but not regularly.", "I currently eat at least 5 portions of fruit and vegetables each day but have only begun doing so within the last 6 months.", "I currently eat at least 5 portions of fruit and vegetables each day and have done so for longer than 6 months.", "I have eaten at least 5 portions of fruit and vegetables each day before but currently do not do so." Five response options were available, *strongly disagree / disagree / uncertain / agree / strongly agree.* The measure was adapted from Marcus, Selby, Niaura and Rossi (1992) and Jones, Harris, Waller, and Coggins (2005).

Mood and self-esteem. Participants completed a single item measuring their current mood, "What is your current mood?" (*negative / positive*). Robins et al. (2001) single item measure of self-esteem was also included, "I have high self-esteem", 1 = *not very true of me*, 5 = *very true of me*. A subset of participants also completed the Rosenberg (1965) self-esteem scale in a mass session at the beginning of the semester. The two self-esteem measures were significantly positively correlated $r(52) = .61, p < .001$.

Past exposure to message. Participants reported whether they had heard of the 5-a-day message before from any of the following sources: friends / family,

magazines, newspapers, the Internet, doctors / nurses, or TV. Participants responded to each source listed by indicating whether they had heard of the campaign before from the source, if they had not, or if they were uncertain. They were also asked to list any additional sources from which they had heard about the message.

Manipulation check. As in Study 1, the value essays were rated (using 7-point response scales, anchored at *not at all* [0] and *very* [6]), on the following items: (a) "Setting aside your own opinions and values, how self-affirmed would you estimate the writer of this passage to have been (at the end)?", (b) "To what extent do they discuss the value in a manner that presents them in a positive light?", and (c) "How important does the value they have selected appear to be to them?".

Results

Manipulation check

The values chosen were rated as being more important to participants in the self-affirmation condition ($M = 6.95$) than in the non-affirmation condition ($M = 0.75$), $F(1, 79) = 334.36$, $p < .001$. Those in the self-affirmation condition ($M = 6.33$) were judged to have been significantly more self-affirmed after writing the values statement than those who were non-affirmed ($M = 0.98$), $F(1, 79) = 272.68$, $p < .001$. Self-affirmed participants ($M = 6.03$) were also rated as writing passages that presented them in a more positive light, than those who were non-affirmed ($M = 0.90$), $F(1, 79) = 229.45$, $p < .001$. Thus the self-affirmation task focused participants on important and positive aspects of the self and the non-affirmation task did not.

Randomisation check

The data for the randomisation checks are in Table 6.3. Self-affirmed and non-affirmed participants did not differ in the amount of fruit and vegetables they reported consuming on a typical day, $F(1,79) < 1$, or in the previous 24 hours, $F(1,79) = 2.10$, $p = 15$. All participants reported eating less than 5 portions of fruit and vegetables on a typical day. With regard to the novelty of the message, 98.7% of the participants had heard about the 5-a-day message from at least one of the sources listed. The self-affirmed and non-affirmed groups did not differ in the average number of sources from which they had heard about the 5-a-day message, $F(1,79) < 1$. In total, 60% of the participants had been told by another person or had acknowledged for themselves that

they had not eaten enough fruit and vegetables in the past year. This did not differ between self-affirmed and non-affirmed conditions, $F(1,79) < 1$. After reading the article both those in the self-affirmed and non-affirmed conditions reported that they needed to eat more fruit and vegetables, $F(1,79) < 1$.

Table 6.3. *Mean Responses to Randomisation Check Measures by Self-affirmation Condition*

	SA ($N = 40$)	NA ($N = 40$)
Typical fruit and vegetable consumption	3.28 (0.94)	3.12 (1.00)
Fruit and vegetable in past 24 hours	2.85 (1.24)	2.47 (1.10)
Number of sources previously heard about 5-a-day message from	3.49 (1.27)	3.40 (1.30)
Told / acknowledge need to eat more fruit and vegetables	24 (60%)	25 (62.5%)
Acknowledged need to change	5.00 (1.32)	4.73 (1.36)
Contemplated need to change	37 (92.5%)	33 (82.5%)
Mean stage of change	2.74 (0.75)	2.77 (1.13)
Self esteem (Robins et al. 2001)	3.53 (0.96)	3.48 (0.78)
Self-esteem (Rosenberg, 1965)	31.08 (3.19)	29.69 (3.29)

Note. Higher scores indicate higher levels of fruit and vegetable consumption, having heard about the 5-a-day message from more sources, a greater acknowledgement of need to change, a more advanced stage of change and higher self-esteem. Standard deviations are in parentheses. SA = self-affirmed; NA = non-affirmed (applies throughout this chapter).

Non-affirmed and self-affirmed participants did not differ in terms of whether they had contemplated (e.g., reported having never thought about eating 5-a-day on the thought about change item) eating five portions of fruit and vegetables everyday in the past, $F(1,79) = 1.83$, $p = .18$. As there were low cell sizes for each of the options available, responses were divided into having thought about changing in the next 10 years to six months, and in the next 2 months to next week. The 10 participants who had never thought about changing and the 14 participants who claimed that they had already made the change, were excluded from the analysis. The distribution of those who reported already making the change did not differ between those who were non-affirmed and self-affirmed, $F(1,70) = 2.44$, $p = .12$. Non-affirmed and self-affirmed

participants did not differ in terms of when they reported having thought about changing, before reading the message, $F(1,53) = 1.53$, $p = .22$.

On the basis of the stage of change measure, 78 participants were classifiable: 5.1% ($N = 4$) reported not eating 5-a-day or intending to change in the next 6 months, 32.1 % ($N = 25$) were thinking of starting to eat 5-a-day in the next 6 months, 53.8% ($N = 42$) reported that they currently ate 5-a-day but not regularly, 3.8% ($N = 3$) reported that they were eating 5-a-day, but had been doing so for less than 6 months, 1.3% ($N = 1$) reported that they were currently eating 5-a-day and had been doing so for longer than 6 months, 3.8% ($N = 3$) reported not currently eating 5-a-day, but to had done so in the past. Excluding those who reported to be in relapse, the non-affirmed and self-affirmed participants did not differ in mean stage of change, $F(1,74) < 1$.

Self-affirmed and non-affirmed participants did not differ in self-esteem, on either the Robins et al., $F(1,79) < 1$, or Rosenberg self-esteem scales, $F(1,79) = 2.42$, $p = .13$.

Main analysis

Unless otherwise stated, data were analysed using one-way ANOVAs, with condition (self-affirmed or non-affirmed) as a between participants variable, to examine whether self-affirmation affected cognitive and affective variables, as well as the key dependent measures (e.g., intentions to change).

Key dependent measures. Analysis of the data in Table 6.4 revealed that self-affirmed participants had greater intentions to eat at least 5 portions of fruit and vegetables each day in the next 7 days, than those who were non-affirmed, $F(1,79) = 5.08$, $p < .05$. The affirmed group were also more likely to a take leaflets (90%) than those who were non-affirmed (65%), $\chi^2(1,80) = 7.17$, $p < .01$. Among those who did take leaflets, there was no difference in the proportion of self-affirmed and non-affirmed participants who took more than one leaflet, $\chi^2(1,62) = .25$, $p = .62$. Self-affirmed participants (57%) were no more likely than non-affirmed participants (50%) to take a token for a piece of fruit, $\chi^2(1,80) = 5.46$, $p = .14$. They were also no more likely to redeem the token, (self-affirmed: 22%; non-affirmed: 35%), $\chi^2(1,43) = .94$, $p = .33$.

Table 6.4. *Participants' Responses to Key Dependent Measures*

	SA ($N = 40$)	NA ($N = 40$)
Intentions	4.61 (1.10)	3.94 (1.54)
Number participants taking leaflets	36	26
Number participants taking tokens	23	20
Number participants redeeming token	5	7

Threat and coping appraisals. Self-affirmed and non-affirmed participants did not differ in their perception of how vulnerable they felt or how serious they believed the consequences of not eating 5 portions of fruit and vegetables a day to be, $F(1,79) = 1.58$, $p = .21$, (Table 6.5). There was no significant difference between self-affirmed and non-affirmed participants' coping appraisals, $F(1,78) < 1$. For ease of interpretation, means for self- and response-efficacy are reported separately in Table 6.5.

Table. 6.5. *Mean Responses to Threat and Coping Appraisal Measures by Condition.*

	SA ($N = 40$)	NA ($N = 40$)
Threat appraisals[a]	4.26 (0.81)	4.03 (0.77)
Self-efficacy[b]	2.14 (0.61)	2.03 (0.61)
Response-efficacy[a]	5.01 (0.93)	4.95 (0.85)

Note. [a]Scored 0 to 6. [b]Scored 1 to 4.

Optimistic bias. Participants' risk perceptions are in Table 6.6. Ratings for risk perceptions were analysed using a 2-way mixed design ANOVA with condition as a between-participants variable and target (self or other) as a within-participants variable. There were no significant effects involving condition, either independently, $F(1,79) < 1$, or in interaction with target, $F(1,79) = 1.32$, $p = .25$. There was, however, a main effect of target, $F(1,79) = 26.54$, $p < .001$, with both self-affirmed and non-affirmed participants reporting the average other to be at higher risk than them personally to experience poor health as a result of not eating 5-a-day. Therefore, self-affirmation did not moderate optimistic bias.

Table. 6.6. *Mean Responses to Risk Perception Measures by Condition.*

	SA ($N = 40$)	NA ($N = 40$)
Risk		
Self	5.45 (1.85)	5.33 (2.27)
Other	6.45 (1.60)	6.90 (1.32)

Note. Higher values indicate greater risk perceptions.

Negative affect. Ratings of negative affect experienced while reading the health message did not significantly differ between the self-affirmed and non-affirmed groups, $F(1,79) = 1.63$, $p = .21$. Self-affirmed and non-affirmed participants did not differ in level of worry about their risk after reading the message, $F(1,79) < 1$ (Table 6.7).

Negative self-feeling. There was no difference in the level of negative self-feeling self-affirmed and non-affirmed participants reported, $F(1.79) < 1$ (Table 6.7).

Beliefs. Both self-affirmed and non-affirmed participants believed that not eating 5 portions of fruit and vegetables a day would have negative effects for their health, $F(1, 79) < 1$ (Table 6.7).

Ease of Imagination. Self-affirmed and non-affirmed participants did not differ in how easy they found it to imagine experiencing poor health as a result of their current intake of fruit and vegetables, $F(1,79) = 1.05$, $p = .31$.

Table. 6.7. *Mean Responses to Measures of Affect, Beliefs, Ease of Imagination and Perceptions of Costs and Benefits by Condition.*

	SA ($N = 40$)	NA ($N = 40$)
Negative affect	2.13 (1.28)	2.52 (1.38)
Negative self-feeling	2.80 (1.41)	3.04 (1.49)
Worry	3.78 (1.29)	3.57 (1.40)
Beliefs	4.72 (1.38)	4.68 (0.89)
Ease of imagination	1.85 (1.12)	1.80 (1.06)
Cost / benefits	2.71 (1.45)	3.13 (1.25)
Mood	4.67 (1.08)	4.15 (1.48)

Note. Higher values indicate higher levels on each of the measures.

Response costs and benefits. The self-affirmed and non-affirmed participants did not differ in terms of their perceptions of costs of eating more fruit and vegetables and the benefits of more unhealthy alternatives, $F(1,79) = 1.84$, $p = .18$ (Table 6.7).

Mood. The effect of self-affirmation on participants' mood approached significance, $F(1,79) = 3.13$, $p = .08$ (Table 6.7). Self-affirmed participants reported that they were in a slightly more positive mood than those who were non-affirmed. To test whether the difference in mood might mediate the impact of self-affirmation on intentions and leaflet taking behaviour, analysis was conducted following Baron and Kenny (1986). However, participants' mood was not found to predict intentions, $R^2 = .03$, $\beta = .17$, $p = .14$, or leaflet taking, $R^2 = .02$, $\beta = .15$, $p = .20$. Therefore, mood did not mediate the effects of self-affirmation.

Regression Analyses

A series of two-step, hierarchical regression analyses were conducted to examine whether the predictors of intentions and leaflet taking behaviour differed in the non-affirmed and self-affirmed conditions. Table 6.8 shows the zero-order correlations between the key outcome variables and predictors. Intentions to change were moderately correlated with coping appraisals and weakly correlated with threat appraisals. Participants' leaflet taking behaviour was only weakly correlated with coping appraisals.

Table 6.8. *Zero-order Correlations between Outcome and Dependent Variables.*

	DV1	DV2	IV3	IV4	IV5
DV1. Intentions					
DV2. Leaflet taking	.17				
IV3. Threat appraisals	.26*	.19			
IV4. Coping appraisals	.64***	.22	.24*		
IV5. Negative affect	-.01	.21	.36**	-.07	
IV6. Negative self-feeling	-.09	.01	.33**	-.05	.62***

Separate analyses were performed within condition. At the first step, coping appraisals, threat appraisals, negative affect and negative self-feeling were entered. At step two the Coping X Threat interaction was entered.

Intentions. For those who were self-affirmed, both coping appraisals, $\beta = .52$, $p = .001$, and negative self-feeling, $\beta = -.35$, $p = .033$, emerged as predictors of intentions (Table 6.9). While greater coping appraisals predicted stronger intentions, higher levels of negative self-affect predicted weaker intentions. In the non-affirmed condition, only perceptions of coping appraisals predicted intentions, $\beta = .75$, $p < .001$. Following Edwards (1984), the Betas for the independent variables were compared. Coping appraisals were found to be a stronger predictor of intentions in the non-affirmed condition, $t(79) = 1.89$, $p < .05$ (one-tailed), and negative self-feeling a marginally stronger predictor of intentions in the self-affirmed condition, $t(79) = 1.53$, $p < .1$ (one-tailed).

Table 6.9. *Betas for Multiple Regressions of Intentions in Self-affirmed and Non-affirmed Participants.*

	SA ($N = 39$)				NA ($N = 40$)			
	β	*p*	R^2	Model *F*	β	*p*	R^2	Model *F*
Threat appraisals	.23	.12			-.04	.76		
Coping appraisals	.52	.001			.75	<.001		
Negative affect	.12	.45			.01	.96		
Negative self-feeling	-.35	.033	.45[a]	6.92***	.14	.42	.54[a]	10.20***
Threat X Coping	-.34	.009	.55[b]	8.20***	-.09	.53	.54[b]	8.10***

Note. [a]Step 1 variables. [b]Step 2 variables.

Examination of the interaction of coping and threat appraisals revealed that the interaction was significant in the self-affirmed condition, $\beta = -.34$, $p = .009$, but not in the non-affirmed condition, $\beta = -.09$, $p = .53$. Simple slopes analyses were conducted to test whether coping appraisals moderated the effects of threat appraisal for self-affirmed participants' intentions to change (Figure 6.1). Analysis revealed that at low, $\beta = .83$, $p < .001$, and moderate levels of threat, $\beta = .50$, $p = .001$, greater coping appraisals predicted greater intentions to change. At higher levels of perceived threat, however, coping appraisals did not predict greater intentions, $\beta = .17$, $p = .39$. Contrary to models such as EPPM and PMT, when self-affirmed participants appraised the threat to be high, but their coping resources to be low, they still reported message acceptance and intentions to change. In comparison, in the non-affirmed condition,

when participants reported high threat appraisals, higher coping appraisals did predict greater message acceptance, $\beta = .51$, $p = .040$ (Figure 6.2). Thus self-affirmation appeared to promote message acceptance and intentions to change in those reporting high threat appraisals, but low coping appraisals.

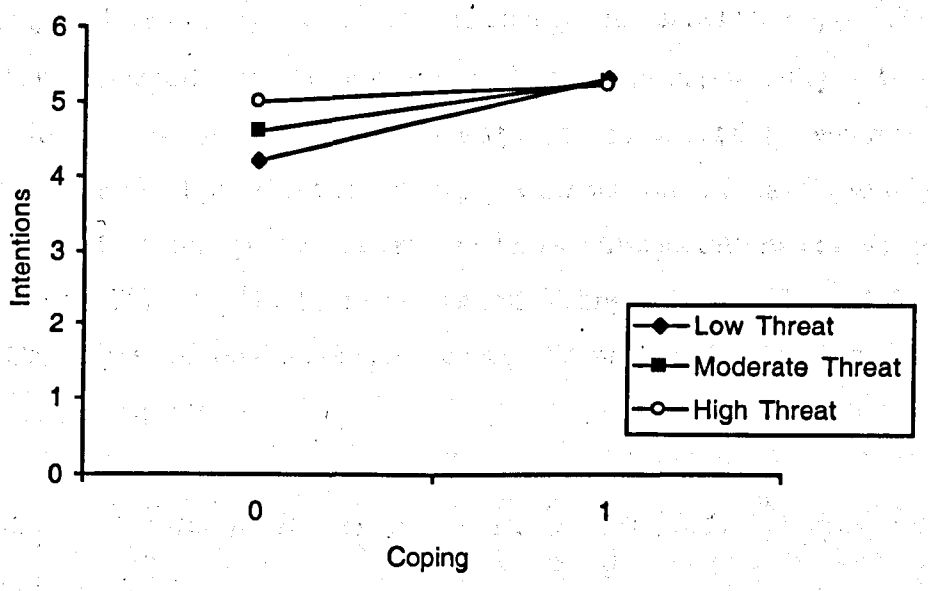

Figure 6.1. Self-affirmed participants' intentions to change as a function of threat and coping appraisals.

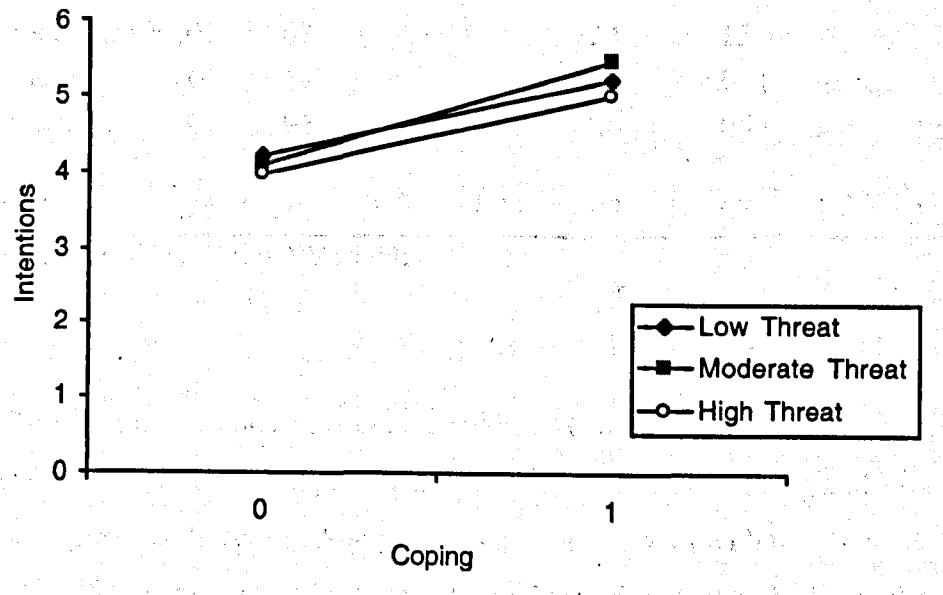

Figure 6.2. Non-affirmed participants' intentions to change as a function of threat and coping appraisals.

Regression analysis was conducted to test whether differences in self-esteem mediated the effects of negative self-feeling on self-affirmed participants' intentions. This was found not to be the case, self-esteem did not predict negative self-feeling in response to the health message, $R^2 = .00$, $\beta = .01$, $p = .94$.

Leaflets. In the self-affirmed condition none of the variables individually predicted leaflet taking behaviour (Table 6.10). In the non-affirmed condition, however, higher levels of negative affect predicted greater leaflet taking, $\beta = .75$, $p < .001$, while negative self-feeling also approached significance, $\beta = -.40$, $p = .059$, such that higher levels of negative self-feeling acted to reduce leaflet taking, whereas higher levels of negative affect promoted leaflet taking. Comparison of Betas for self-affirmed and non-affirmed participants revealed no significant differences, either for negative affect, $t(79) = .90$, p >.1, or negative self-feeling, $t(79) = -.50$, p >.1. The Threat X Coping interaction did not approach significance for either self-affirmed or non-affirmed participants.

Table 6.10. *Betas for Multiple Regressions of Leaflet Taking in Self-affirmed and Non-affirmed Participants.*

	SA ($N = 39$)				NA ($N = 40$)			
	β	*p*	R^2	Model *F*	β	*p*	R^2	Model *F*
Threat appraisals	.28	.13			-.08	.62		
Coping appraisals	.07	.68			.22	.13		
Negative affect	-.08	.69			.75	<.001		
Negative self-feeling	.01	.96	.09[a]	0.85	-.40	.059	.34[a]	4.58**
Threat X Coping	.26	.12	.16[b]	1.22	-.07	.67	.35[b]	3.62**

Note. [a]Step 1 Variables. [b]Step 2 Variables.

Self-esteem

Moderated regressions were conducted to test whether self-esteem moderated the effects of self-affirmation on participants appraisal of threat, coping and experience of fear and negative self-feeling. Analysis was conducted both with the single Robins et al. (2001) self-esteem item and for the subset of participants who had completed the Rosenberg self-esteem scale. The data for the interaction of Condition x Self-esteem

are presented in Table 6.11. Self-esteem did not moderate the effects of self-affirmation on any of the measures.

Table 6.11. *Betas for Moderated Regressions Examining the Impact of Condition X Self-esteem Interaction.*

	Robins et al. ($N = 80$)		Rosenberg ($N = 52$)	
	β	*p*	β	*p*
Intentions	-.08	.49	.09	.50
Leaflet taking	-.16	.16	.02	.89
Threat appraisals	.05	.65	.21	.13
Coping appraisals	-.03	.80	.12	.39
Negative affect	-.15	.89	-.00	.98
Negative self-feeling	.16	.18	.15	.29

Stage of change

Moderated regression analysis was conducted to examine whether the effects of self-affirmation on participants' intentions to change were moderated by their reports of stage of change. Neither stage of change, $\beta = .10$, $p = .35$, nor the interaction, $\beta = .19$, $p = .12$, predicted participants' intentions to eat 5-a-day.

Moderated regression analysis of participants' leaflet taking behaviour revealed that, whereas stage of change did not predict leaflet taking, $\beta = .09$, $p = .43$, the interaction of Condition X Stage was significant, $\beta = -.29$, $p = .013$. Simple slopes analysis was conducted at three levels of the moderator: low levels of stage of change (1 *SD* below mean), moderate levels of stage of change (mean) and high levels of stage of change (1 *SD* above mean). The data are in Figure 6.3. Self-affirmation had a significant effect at low, $\beta = .61$, $p < .001$, and moderate levels of stage of change, $\beta = .30$, $p = .005$, but not at high levels of stage of change, $\beta = -.004$, $p = .98$.

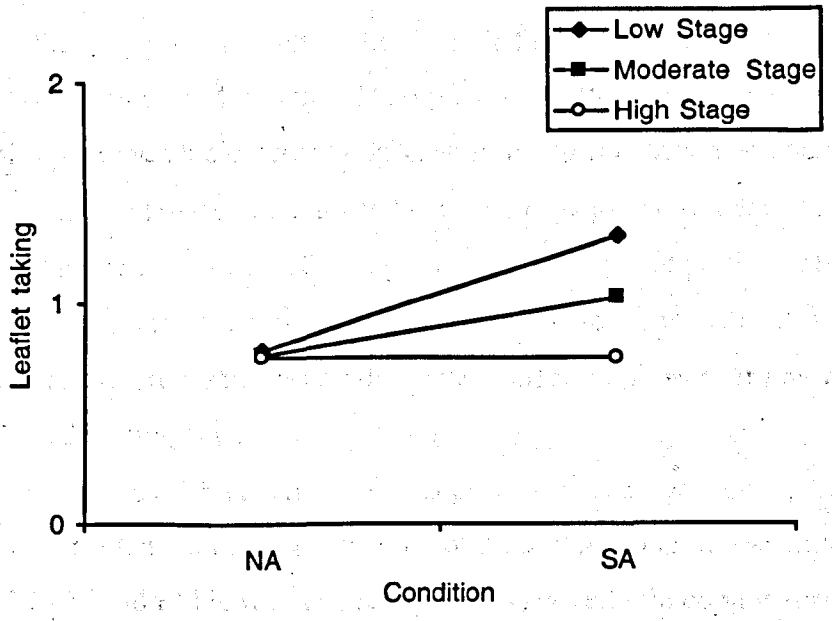

Figure 6.3. Interaction of condition and stage of change for leaflet taking behaviour: Simple slopes for condition at three levels of stage of change.

Discussion

Self-affirming prior to receiving an article outlining the 5-a-day fruit and vegetables message increased intentions to eat 5 portions of fruit and vegetables over the next 7 days. Self-affirmed participants were also more likely to take leaflets providing tips on how to increase their intake and describing portion sizes. Self-affirmed participants did not however take more tokens to exchange for fruit after the experiment. Self-affirmation promoted personal acceptance of a health message, which was both an established health risk and promoted adopting a healthy behaviour, rather than reducing an unhealthy behaviour.

In the present study, there was no evidence that self-affirmation increased threat appraisals, coping appraisals, or message acceptance in terms of increased risk perceptions, ease of imagination, or belief in the link. Nor did self-affirmed participants report changes in negative affect or negative self-feeling in comparison to the non-affirmed participants. This suggests that the effects of self-affirmation on intentions to change and leaflet taking were not mediated by changes in these variables.

Though self-affirmation did not directly influence any of the mediating variables identified by models such as the Extended Parallel Process Model (Witte, 1992, 2000), or Protection Motivation Theory (Rogers, 1975), there was evidence that these variables predicted the outcomes differently for self-affirmed and non-affirmed participants. This was also the case for the measure of negative self-feeling. Self-affirmation did not reduce the level of negative self-feeling that participants experienced while reading the article, as could be predicted from self-affirmation theory. However, negative self-feeling did have a different impact for non-affirmed and self-affirmed participants.

The interaction of threat and coping appraisals was a significant predictor of intentions for self-affirmed participants, but not those who were non-affirmed. Contrary to EPPM and PMT, when threat appraisals were high, coping appraisals did not increase intentions to change for self-affirmed participants. Thus, even participants who reported low coping appraisals still intended to change. In comparison, for non-affirmed participants coping appraisals increased message acceptance regardless of threat appraisals. This finding is contrary to that of Reed and Aspinwall (1998), who found an increase in perceived behavioural control following self-affirmation. In the present study self-affirmation did not increase coping appraisals, but actually reduced the importance of perceptions of coping resources. This finding supports self-affirmation theory, suggesting that for participants with high threat appraisals, self-affirmation provided a resource to accept the threat even when coping resources were low.

An alternative explanation for self-affirmation promoting intentions to change among those with high threat but low coping resources is that self-affirmation promoted mindless acceptance of the message. Self-affirmed participants who reported high threat appraisals but low coping appraisals may not have considered their resources to carry out the behaviour change.

For self-affirmed participants, negative self-feeling also emerged as a significant predictor of intentions, with higher levels of negative self-feeling interfering with message acceptance. In contrast, negative self-feeling did not predict non-affirmed participants' intentions. Thus, only when positive aspects of the self were made salient prior to reading the health message did negative self-feeling interfere with

intentions to change. This finding may reflect a limitation of the effects of self-affirmation. For participants who felt the most negative self-feeling in response to the article, self-affirmation was unable to promote acceptance of the message in terms of intentions to change. Negative self-feeling was not found to be associated with self-esteem, indicating that this effect could not be explained in terms of low self-esteem.

In predicting leaflet taking, for non-affirmed participants negative affect and self-related negative affect predicted leaflet taking. Non-affirmed participants who experienced the most fear in response to the article were more likely to take a leaflet. For these participants, who did not intend to change, taking a leaflet may have constituted a fear control process. This would be consistent with the findings of Study 1, which demonstrated that self-affirmed participants reported greater negative affect than those in the non-affirmed condition, suggesting non-affirmed participants may have engaged in fear reduction strategies.

Though negative self-feelings did not predict intentions of non-affirmed participants, it did predict leaflet taking. Higher levels of negative self-feeling interfered with leaflet taking. This provides some evidence that high levels of negative self-feeling in response to a health message can be associated with defensive responding and reduction in health promoting behaviour as self-affirmation theory suggests. However, why negative self-feeling only interfered with the behavioural measure and not intentions is unclear.

For self-affirmed participants none of the variables predicted leaflet taking. This finding may reflect the fact that 90% of the self-affirmed participants took a leaflet. Self-affirmation was effective at promoting leaflet taking regardless of threat or coping appraisals.

There were no effects of self-affirmation on participants' token-taking behaviour. However, this measure might not provide an accurate measure of message acceptance. For instance, some participants reported taking a token because they were hungry and, anecdotally, more participants took tokens closer to lunchtime than later in the day (although no data were collected to confirm this).

The findings of the present study suggest that self-affirmation did not influence message acceptance either on general measures of acceptance, such as belief in the risks, or personal acceptance, such as risk perceptions and ease of imagination. Nor did

the message impact upon participants' threat appraisals. In contrast, Study 1 demonstrated that self-affirmation could increase participants' perceptions of personal risk, as have Sherman et al. (2000). One reason for the difference between the findings of the present study and Study 1 could be that the present study presented participants with a well-established health risk. As participants already knew that they should be eating 5 portions of fruit and vegetables a day to promote their health, those who were non-affirmed may have been limited in attempts to denigrate the message. Also, as participants provided evidence that they did not eat enough fruit and vegetables, and had verbally confirmed to the experimenter that they were not performing this behaviour regularly, they would have been limited in attempts to defend against the personal relevance of the message. Furthermore, 54% of participants reported being in the preparation stage, suggesting they had already accepted that this was a personally relevant message. As the work of Buunk and Dijkstra (2001) suggests, participants in the present study may have recognised that they needed to eat more fruit and vegetables to promote their health, but had rationalised this risk to allow them to accept the risk without changing their behaviour. The health message used in the present study did not specifically target possible rationalisations (e.g., "I will change my diet when I have more time / money / choice at meal times"), however, the message was still effective at increasing intentions to change in the self-affirmed condition. Perhaps self-affirmation acted to allow participants to reappraise the threat and reduced the use of rationalisations.

Stage of change

Analysis of participants' stage of change indicated that self-affirmation was able to increase intentions to change not only for those in the contemplation or preparation phases, but also for pre-contemplators. This provides promising findings that self-affirmation can not only impact upon message acceptance for those who already intended to change but also for those who had heard the message before but not previously intended to change.

Analysis of the leaflet taking measure suggested that self-affirmation promoted leaflet taking in those who reported being at the earlier stages of change, but not those at the later stages of change. This finding may suggest that self-affirmation was most successful at promoting message acceptance for those reporting to be at the early

stages of change. Alternatively, those at later stages may have already sought out information about changing their diet, and thus took fewer leaflets.

One limitation of the current methodology, however, was the stage of change items used. A pre-manipulation measure of stage of change was not included prior to reading the message; however, clearly doing so would have provided a more accurate measure of participants' stage before reading the health message. This is confirmed by examining discrepancies on the item measuring thoughts about changing and the stage of change measure. On the "thought about changing" measure 14 participants reported already making the change, though they had already confirmed to the experimenter that they did not regularly eat 5 portions of fruit and vegetables each day. In contrast, on the stage of change measure only 1 participant reported eating 5-a-day for more than 6 months and a further 3 participants for less than three months. This inconsistency in responding could reflect the fact that participants reported more what they intended to do rather than what they currently actually did.

Self-esteem

In the present study, as with the majority of results from previous studies, self-affirmation was not found to be moderated by self-esteem. This was the case using both the Robins et al. single item measure of self-esteem and the more widely used Rosenberg self-esteem scale. The findings of studies in the current thesis, suggesting that self-affirmation was not moderated by self-esteem, were replicated using two different measure of self-esteem, and one measured at a different time point to the experiment. This finding suggests that, contrary to Steele et al. (1993), the effects of self-affirmation are not necessarily more effective for high self-esteem participants. In fact the results of the present study suggest that self-affirmation may be less effective for those who experience the greatest negative affect in response to a health message, but this does not appear to be associated with self-esteem.

Mood

The present study found evidence that self-affirmation participants reported being in a slightly more positive mood after reading the health information than those who were non-affirmed. However, in line with self-affirmation theory, this increase in mood did not mediate the effects of self-affirmation.

Summary

The findings of the present study supports those of Studies 1 and 3, suggesting that self-affirmation can promote acceptance of health information. The fact that self-affirmation influenced the acceptance of a well-established health message, and did so regardless of coping appraisals, suggests that self-affirmation may have potential as an applied technique.

The present studies tested the effects of self-affirmation on the processing of personally-relevant health information, examining more specifically whether self-affirmation reduced biased processing of this information, and if so whether it was associated with systematic processing. The effects of self-affirmation on cognitive and affective mediators associated with message acceptance, for example threat and coping appraisals and negative affect, were also assessed. Steele's self-affirmation theory (1988) predicts that when information, for example health information, threatens self-integrity, people are motivated to engage in processes to reduce the threat to the self. This can result in biased processing of health information (Chaiken et al., 1997; Ditto & Lopez, 1992). According to Steele, affirming unrelated valued aspects of the self can restore self-integrity after exposure to a negative and personally-relevant health message, and thus reduce the motivation to engage in biased processing. Steele suggests that self-affirmation provides a resource to confront the consequences of negative and personally-relevant information, and should reduce biased processing but not by reducing depth of processing.

These predictions were tested using four experiments measuring the impact of self-affirmation on measures of biased processing (e.g., general message acceptance, personal message acceptance, avoidance of attention, accessibility of defensive cognitions and changes in health behaviours), and measures of depth of processing (e.g., self-reports, reading time, recall of information, sensitivity to message strength).

Self-affirmation and biased processing

The findings of Studies 1, 3 and 5 suggest that self-affirmation is able to reduce biased processing of personally-relevant health information. When participants were presented with a relevant and convincing health message (Study 1) self-affirmation promoted greater personal message acceptance on measures of risk perceptions, intentions to reduce an unhealthy behaviour, ease of imagining experiencing ill-health as a result of the unhealthy behaviour, and negative affect. Self-affirmation appeared to reduce biased processing by reducing rejection of the personal implications of the health information. In Study 3, self-affirmation was also found to reduce biased processing at the level of attentional avoidance, with self-affirmed participants

choosing more often to read a more threateningly titled health article than those who were non-affirmed. Also in Study 3, self-affirmation reduced endorsement of counter-arguments and led to participants recalling less risk-disconfirming evidence after one-week. This finding is consistent with the hypothesis that self-affirmation reduces bias in recall. In comparison to non-affirmed participants, those who were self-affirmed also reported greater intentions to change an unhealthy behaviour (Study 1, 5), a greater reduction of an unhealthy behaviour (Study 3), and engaging more in behaviours to promote a health behaviour (Study 5). Self-affirmation was seen to reduce biased processing and promote message acceptance for both novel and more established health threats. These findings support Steele's theory, suggesting that affirming valued self-concepts in domains unrelated to a health message can reduce biased processing.

Reed and Aspinwall (1998) and Sherman et al. (2000) have previously shown self-affirmation may have the potential to reduce biased processing of health information. Reed and Aspinwall found evidence of reduction in biased processing on measures of general message acceptance. Sherman et al. (2000) demonstrated that self-affirmation promoted personal message acceptance (e.g., greater risk perception and intentions to change). The present research extended the findings of past studies by measuring the impact of self-affirmation using a range of measures of message acceptance and demonstrating that the effects of self-affirmation are durable, with changes in message acceptance persisting for up to one-month (Study 1), and changes in behaviour after 1 week (Study 3). These findings suggest self-affirmation may have the potential as an applied technique to encourage acceptance of personally-relevant health information.

As discussed in Chapter 1, self-affirmation does not always lead to more objective processing of health information (Boney-McCoy et al., 1999; Klein et al., 2001; Reed & Aspinwall, 1998). The effects of self-affirmation on message acceptance in the present studies were also not always consistent. Self-affirmation appeared to have very little effect on explicit measures of general or personal message acceptance in Study 3, though subsequently self-affirmed participants did report reducing their caffeine consumption to a greater extent than those who were non-affirmed. In Study 4, self-affirmation was found to be associated with slightly less persuasion and lower

intentions to change for those at high risk. Replicating the findings of Klein et al. (2001), in comparison to non-affirmed participants, those who were self-affirmed were more likely to base their risk perceptions on their level of self-esteem as opposed to drinking behaviour. The factors that might moderate whether self-affirmation is successful at reducing biased processing or is associated with less objectivity are discussed below.

Self-affirmation and depth of processing

Past studies that have examined the effects of self-affirmation on the processing of health information have been inconclusive about whether self-affirmation leads to message acceptance through systematic processing of risk information (e.g., Ruiter et al., 2001). Rather than self-affirmed participants accepting a message after thoughtful consideration of the evidence, self-affirmation may promote agreeableness, with self-affirmed participants engaging in heuristic processing. If this were the case, self-affirmation may be associated with short-lived effects for persuasion (Petty & Wegner, 1999).

The present studies extended past research by providing a variety of tests to examine the effects of self-affirmation on depth of processing. In Study 3, self-affirmed and non-affirmed participants did not differ in the time they spent reading the health information, the amount of information they recalled after one-week, or their self-reports of depth of processing. This suggests that self-affirmed and non-affirmed participants did not differ in the effort they applied to processing the message, a finding inconsistent with self-affirmation promoting mindless acceptance of health information. Furthermore, Study 1 provided evidence that self-affirmation produced durable changes in personal message acceptance, with self-affirmed participants maintaining the increase in risk perception and ease of imagining the negative health consequences of their behaviour. This enduring increase in persuasion is consistent with systematic rather than heuristic processing. These findings suggest that increased message acceptance after self-affirmation is not a result of mindless acceptance of the message and heuristic processing.

In contrast, in Study 4, in which self-affirmation did not reduce biased processing, self-affirmed participants appeared to be less sensitive to the strength of the arguments presented, a finding consistent with more heuristic processing. Thus,

though there is evidence to suggest that increases in message acceptance were not mediated by a reduction in depth of processing, in some circumstances self-affirmation may be associated with less effort in processing a health message, an issue that will be returned in more detail below.

Limits to the effects of self-affirmation

The present studies provided mixed evidence for the effects of self-affirmation on actual behaviour change. In Study 1, although self-affirmed participants reported greater intentions to change this was not reflected in their drinking behaviour. In Study 3, however, self-affirmed participants did report a reduction in their caffeine consumption a week after reading the health message. This change in behaviour was mediated by an increase in belief in the message. Whether or not self-affirmation influences behaviour does not appear to be a result of how effective self-affirmation is at reducing biased processing. For instance, in Study 1 self-affirmation appeared to have more consequential effects on the explicit measures of message acceptance than in Study 3, but less impact upon behaviour change. Thus the effects of self-affirmation on actual behaviour may depend on the health behaviour targeted. Self-affirmation may reduce biased processing of the message, but not influence other processes that may be important in the maintenance of an unhealthy behaviour, such as social norms and habit. The findings of Study 1 suggest that, in some cases, where an unhealthy behaviour may be difficult to change, self-affirmation alone is not sufficient to influence behaviour change.

There was no evidence from the present studies that self-affirmation reduced optimistic bias in participants' risk perceptions. In Studies 1, 4, and 5, both self-affirmed and non-affirmed participants reported the average other to be at greater risk of experiencing ill-health as a result of their behaviour, than they believed themselves to be. (This was not the case in Study 3, in which both self-affirmed and non-affirmed participants saw themselves as at the same risk as the average other for experiencing FBD and breast cancer). Even when self-affirmation promoted increases in personal risk perceptions (Study 1) increases were also seen in risk estimates for the average other. The effects of optimistic bias on health behaviours are still unclear (Weinstein & Klein, 1996). For example, whereas optimistic bias has been argued to hinder people

from changing risky health behaviours (Weinstein, 1980, 1989), it has also been argued to have beneficial effects for coping and mental health (Taylor & Brown, 1988). The causes of optimistic bias are also unclear, with both cognitive and motivational accounts aiming to explain this bias (Alicke et al., 1995; Weinstein, 1980). Steele's self-affirmation theory might suggest optimistic bias is a result of participants attempting to restore their self-integrity by making favourable comparative risk judgements. The fact that self-affirmation was unable to reduce this bias may suggest that the effects of self-affirmation were not powerful enough to overcome a bias that has previously been shown to be highly resilient (Weinstein & Klein, 1995). Alternatively, self-affirmation's inability to reduce optimistic bias may reflect the role of cognitive factors in contributing to this bias. In a recent review of optimistic bias, Chambers and Windschitl (2004) argue that while motivated factors may sometimes contribute to optimistic bias, to fully understand the bias, non-motivational factors must also be considered.

Self-esteem as a moderator of the effects of self-affirmation

According to Steele (1993) those with high self-esteem have more resources (more favourable self-concepts) with which to restore their self-integrity and thus find affirming the self easier than those with low self-esteem. In addition, those with low self-esteem may find self-affirmation tasks less credible and relevant (Stone & Cooper, 2003), with self-affirmation techniques being less effective for those with low self-esteem. An alternative prediction is that those with low self-esteem may have the most to gain from self-affirmation manipulations, as they do not tend not to engage naturally in self-enhancing processes (Baumeister et al., 1989; Beauregard & Dunning, 2001; Sommer & Baumeister, 2002). To test these predictions, the present studies included measures of self-esteem to assess whether the effects of self-affirmation were moderated by self-esteem.

In Study 2, higher levels of self-esteem were associated with greater reports of salience of positive and central aspects of the self-concept, both after a self-affirmation and a control task. After self-affirmation, however, increases in salience of positive and valued self-characteristics and feelings of positivity towards the self were seen regardless of level of self-esteem. Thus, regardless of self-esteem, self-affirmation was effective at making salient resources that could be used to restore self-integrity

following a self-threat. Although self-esteem did moderate the effects of self-affirmation on a handful of measures of message acceptance (e.g., intentions in Study 1 and risk perceptions in Study 3), on balance the findings from Studies 1, 3, and 5 suggest that the self-affirmation manipulations employed were just as successful at reducing biased processing in those with high and low self-esteem. Regardless of self-esteem, self-affirmation promoted greater personal message acceptance in Studies 1 and 5. In Study 3, self-affirmation was effective at increasing general message acceptance (increasing the belief in message, and reducing the endorsement of counter-arguments) and promoting greater attention to the more threateningly-titled health article regardless of self-esteem.

Research published since beginning the present research (Schmeichel & Martens, 2005) also supports this finding, suggesting that self-esteem does not moderate the effectiveness of self-affirmation. Using a measure of state self-esteem, Schmeichel and Martens found that self-affirmed American participants, who had written about their most important value, were less likely to derogate an anti-American essay. This effect was not moderated by self-esteem. These findings suggest that, contrary to Steele (1993), self-affirmation may be as effective for those with low self-esteem as those with high.

Further research is needed to establish if self-esteem does moderate the effectiveness of some but not other self-affirmation techniques. For example, those with low self-esteem may find positive feedback a less credible source of self-affirmation. The use of value affirmations, however, may be just as effective for those with low or high self-esteem, perhaps because they are self-descriptive and credible to both those with high and low self-esteem.

What moderates the effectiveness of self-affirmation?

In the present studies there is evidence that, while self-affirmation can reduce biased processing and promote message acceptance, it can also lead to less in-depth processing and less objectivity (Study 4). Similarly, within the literature examining the effectiveness of self-affirmation in relation to health threats there is evidence both for (Reed and Aspinwall, 1998; Sherman et al., 2000) and against (Boney-McCoy et al., 1999; Klein et al., 2001) self-affirmation as an effective technique to promote objectivity and acceptance of personal risk. What factors might moderate the

effectiveness of self-affirmation is still unclear. The current thesis provides some pointers to some of these factors.

Based on the contradictory findings of Studies 1 and 4, one factor that may have moderated the effects of self-affirmation was a difference between the two samples' perceptions of their coping resources. Models, such as Witte's (1992) EPPM, suggest that, even when threat appraisals are high, if coping appraisals are low, a message will be rejected. Perhaps self-affirmation promotes acceptance of personal risk, but unless people feel able to adopt a healthy behaviour (or reduce an unhealthy behaviour) the message will still be rejected. In Study 4, where an older, non-student sample was recruited, the higher risk women may have felt less able to change their drinking behaviour than the younger women in Study 1, and thus they were more likely to reject the message. Steele's theory suggests that self-affirmation should be effective even when coping appraisals are low. According to Steele, non-affirmed participants reject a health message when threat is high but coping appraisals are low because, by realising they do not have the resources to change, accepting the message does not provide an adequate route to restore self-integrity. In contrast, self-affirmed participants have a direct route to restore self-integrity allowing them to accept the health message regardless of coping appraisals. Study 5 provided a test of whether self-affirmation is effective when coping resources were low. Supporting self-affirmation theory, for participants with high threat appraisals, regardless of coping appraisals, self-affirmation promoted intentions to engage in a healthy behaviour. Thus, self-affirming when coping appraisals are low appears to provide a route for message acceptance.

Fry and Prentice-Dunn (2005) have recently published a study also examining whether coping appraisals might moderate the effectiveness of self-affirmation to reduce the use of maladaptive coping strategies, such as avoidance, hopelessness and religiosity, and increase the use of adaptive coping, such as behavioural intentions and rational problem solving. Participants were presented with information describing breast cancer, including information about its treatment and risk factors. Half the participants were also provided with information aimed at increasing their perceptions of self- and response-efficacy. For women who had no previous experience of breast cancer, self-affirmation significantly reduced maladaptive coping in terms of

avoidance and hopelessness, but only when no coping information was given. Thus, when women's perceptions of self- and response efficacy were boosted, self-affirmation did not influence maladaptive responding. Presumably even non-affirmed women who had received coping information felt able to deal with the threat and the motivation to respond defensively was reduced. In contrast, when no coping information was provided self-affirmation had its greatest effects. This finding supports those of Study 5 and suggests that self-affirmation does have the potential to reduce biased responding, even when coping appraisals are low. Therefore, the results of Study 4, in which self-affirmation did not reduce biased processing, would not appear to be a result of the participants having low coping appraisals.

A second potential moderator of the effectiveness of self-affirmation is participants' perceptions of the long-term benefits of accepting the health information. As described in Chapter 5, Raghunathan and Trope (2002) have examined the role of positive mood as a resource to deal with negative, personally-relevant health information. They argue that, when health information is perceived to have long-term health benefits, positive mood can act as a resource to reduce biased processing. When, however, the long-term benefits of health information are unclear, positive mood acts as information about the environment, leading participants to engage in less in-depth processing and reducing acceptance of health information. Raghunathan and Trope suggest that perceptions of long-term benefit may also act to moderate the effects of boosts to self-esteem for processing of health information. For instance, when health information has clear long-term benefits, self-affirmation should act as a resource and increase message acceptance, whereas if the long-term benefits are unclear, a boost to self-regard could act as information about the environment, reassuring participants and leading to less in-depth processing and less persuasion. Looking back at the findings of Study 4, this explanation might not only account for the reduction in persuasion, but also the reduced sensitivity to message strength. Perhaps the women in Study 4, who formed an older sample than those in Study 1, perceived there to be fewer long-term benefits of reducing their alcohol consumption than did those in Study 1. For example, compared to younger women, other factors increasing their risk of breast cancer may have been more salient and alcohol as a risk factor may have seemed less important. Alternatively the older women could have perceived that the damage to the their health

from drinking alcohol may have already been done, or even that there were more long-term benefits from drinking alcohol, for example for heart disease, associated with older age.

Can the findings of Klein et al. (2001) and Boney-McCoy et al. (1999) also reflect ambiguity in the perceived long-term benefits of the health information? In both studies, rather than presenting participants with a health message outlining a health risk and the need to change behaviour, participants were asked to reflect on risky health behaviours they performed and their health consequences. Compared to the use of a health message, this task may have made it less clear what long-term benefits recognising their increased risk may have had. If the long-term benefits were less obvious, according to Raghunathan and Trope, the boost to perceptions of self-regard may have led to participants feeling less vulnerable and reduced the motivation to engage in inductive processing (i.e., "bottom-up"). The boost to self-regard may have acted not as a resource but as information. This may explain why participants in Klein et al's study reported risk perceptions based on their self-esteem rather than their risk factor standing, while those in Boney-McCoy et al. (1999), who engaged in more self-affirmation, felt less vulnerable.

Further research to establish whether perceptions of the long-term benefits of health risk information do moderate the effectiveness of self-affirmation is clearly needed. Furthermore, it might also be the case that the long-term benefits of accepting threat information in other domains may moderate the effects of self-affirmation. For example, does self-affirmation only reduce biased processing of feedback about personal traits, when these traits are perceived as malleable? Presumably, if a participant believes there is no way of changing, for example, their general intelligence, accepting negative feedback on this trait may have no long-term benefit. In this case would self-affirmation reduce biased processing of test results?

If the effects of self-affirmation are not moderated by the long-term benefits of the information, does this mean self-affirmation in some circumstances could be maladaptive? The motivated accounts of biased processing of health information suggest that defensive processing of personally-relevant health information can serve important functions. For instances in moderation, minimisation, rationalisation or denial may provide an effective means of dealing with a health threat when a person

perceives there is little they can do to avoid that threat (Croyle, Sun & Hart, 1997; Sutton, 1982; Witte, 1992). Taylor and colleagues (1988, 2000) suggest that positive beliefs about one's health, even when they are unrealistic, may have a protective influence for mental as well as physical health. Does self-affirmation have negative consequences for well-being if it promotes message acceptance even when participants perceive there is little they can do to avoid the threat? For instance in Study 5, participants who reported high threat appraisals, but low self- and response-efficacy, still accepted their need to change and intended to do so. For these participants does self-affirmation have a positive impact? For example, by allowing them to accept their need to change, does self-affirmation encourage them to begin to address their low coping appraisals, or alternatively are these participants left feeling at risk but unable to change?

Further research examining what factors might moderate the effectiveness of self-affirmation to reduce biased processing and examining the long-term impact of self-affirmation, especially under circumstances where accepting negative information may not be beneficial, would both increase our understanding of the effects of self-affirmation for processing health messages and responses to threats to the self more broadly.

Testing the assumptions of self-affirmation theory and the processing of health threats.

Predictions about self-affirmation's ability to reduce biased processing of negative and personally-relevant health information are based on two assumptions. Firstly, that health messages pose a threat to participants' self-integrity and, secondly, that people are motivated to engage in biased processing to restore self-integrity. The studies in the present thesis did not set out to specifically test these assumptions, but provide evidence relevant to them.

Are health-threats threats to self-integrity?

The present studies suggest that affirming one's strengths or values in a domain unrelated to health can provide a means of reducing biased processing. This finding is consistent with claims that health messages can act as self-threats (Croyle et al., 1997; Giner-Sorolla & Chaiken, 1997), because if affirming some unrelated aspect of the self

reduces biased processing, it suggests that health messages also pose a threat to the self.

If health threats do act as threats to self-integrity we might expect them to be associated with negative self-feeling, such as feeling disappointed with the self, guilty or self-critical. Pilot data from Study 5 supported this. In response to negative health information people did report, at least retrospectively, negative self-affect. This finding suggests health messages can have negative implications for the self.

Though health messages may appear to have negative implications for the self, this does not necessarily mean all people will find health messages threatening. For example, Crocker and Wolfe (2001) suggest that the types of events that pose a threat to people's self-esteem will differ. Whereas for one person a poor score on a maths test may threaten a deeply held belief about their mathematical ability, for another, who does not value doing well at mathematics, the poor score may have little impact on the self. It may well be that for some participants, health provides a more important value than for others, or in some cases, for example hypochondria, people may actually seek information to confirm that they are unhealthy rather than attempt to ward off this information. One limitation of the present studies is that measures of individual differences in how strongly participants valued health was not taken. Pilot data from Study 5 did suggest, however, that all participants reported being healthy to be important to them. Furthermore, from an evolutionary perspective, valuing one's health has clear advantages. Assuming health will be equally valued by all participants is problematic (Crocker & Wolfe, 2001). Further research examining the effects of self-affirmation on the processing of health information might benefit from including measures of importance of health as a value, and testing whether, as the theory suggests, self-affirmation has its strongest effects when health is highly valued. For example, if health is not highly valued, a health message should not threaten self-integrity, and self-affirmation should have little effect on message acceptance.

The findings of the present studies also suggest that models aiming to understand the processing of fear appeals might benefit from considering the role of motivational factors other than fear. Das, de Wit and Strobe's (2003) Stage Model of processing fear appeals is one model that does suggest that defensive processing is motivated by threats to self-conceptions. If defensive processing is motivated by

threats to a positive experience of the self, one might predict that higher levels of negative self-feeling may predict message rejection. Models of processing of fear appeals, including Das et al.'s stage model, make no specific predictions about the roles of negative self-feeling or what impact self-resources may have upon message acceptance. Incorporating the self into models of processing of health messages may be beneficial. For example, models such as Witte's (1992) EPPM suggest that the impact of fear upon message acceptance is moderated by coping appraisals, while the evidence from Study 5 indicates that this is not the case when positive aspects of the self unrelated to the health behaviour are made salient. This suggests that models of processing should consider the role of resources other than coping appraisals that may allow people to deal with negative self-relevant information, such as positive beliefs about the self in unrelated domains.

Research examining the role of affective states, other than fear, in the processing of health messages is limited (Witte & Allen, 2000). The present research suggests that examining the role of negative self-feeling may provide a fruitful place to begin assessing the role of other affective responses. For example, the findings of Study 5 indicated that, like fear, negative self-affect could also interfere with engaging in a behaviour to promote health.

Further tests are also needed to clarify the relationship between self-affirmation and negative self-affect. Steele suggests that self-affirmation provides a resource to restore self-integrity. Evidence, however, from Study 5 suggests that self-affirmation did not reduce negative self-feeling following the health message. Perhaps self-affirmation does not reduce the negative implication for the self of a health message, but allows participants to face up to the negative self-consequences. The findings of Study 5 did suggest, however, that it was among those who reported the most negative self-feeling that self-affirmation was least effective at increasing intentions to adopt a healthy behaviour. A better understanding of the relationship between self-affirmation and negative self-feeling may shed light on some of the limitations of the effects of self-affirmation.

Is biased processing of health information motivated?

Examining the effects of self-affirmation on the processing of health information is also relevant to the debate over whether biased processing is a result of

motivational or non-motivational processes. Self-affirmation theory suggests that biased processing is motivated. As outlined in Chapter 1 there are, however, other plausible accounts for biased processing. For instance, according to Renner (2004) participants' expectation about information may account for biased processing. Renner suggests that unexpected information receives greater scrutiny and consequently tends to be evaluated more negatively and found to be less persuasive. Renner provides convincing evidence that expectations are important in predicting biased responding, demonstrating that when positive personally-relevant health information is unexpected it is also evaluated more harshly. Can the effects of self-affirmation be interpreted using a non-motivational account? For example, does self-affirmation change participants' expectations about health information they receive or lead to them feeling less surprised by negative information? Though non-motivational explanations are possible, they appear to be a less parsimonious account for the effects of self-affirmation than that of motivated processing. That is not to say that cognitive factors do not contribute to biased processing, but that at least sometimes, biased processing of health information may be influenced by motivated processes. Further research, establishing what mediates the effects of self-affirmation and direct tests of the effects of self-affirmation on participants' expectations, could inform the debate concerning whether biased processing is motivated. Ultimately, however, teasing apart the influences of non-motivational and motivational processes in biased processes may not be possible (Tetlock & Levi, 1982).

Are all self-affirmations alike?

Steele's self-affirmation theory recognises that some forms of self-affirmation are likely to be more successful in promoting self-objectivity than others. For example, self-affirming a central rather than peripheral aspect of the self is likely to be more effective (Steele, 1988). Recently published research has begun to distinguish other factors that may differentiate self-affirmation techniques. Schimel, Arndt, Banko and Cook (2004) investigated the impact of intrinsic affirmations, which focus participants on self-definitional values without making salient social standards or expectations of performance (e.g., "Being a doctor reflects the way I think people should care for others") and extrinsic affirmations, which focus participants on the contingent nature of the values (e.g., "I know I am a competent doctor because other people tell me I am

doing well"). Schimel et al. (2004) examined the use of self-handicapping after a mental arithmetic test as a measure of defensive concerns. They found that intrinsic affirmations, rather than extrinsic affirmations or a control task, reduced self-handicapping. Schimel et al. suggest that affirming intrinsic aspects of self-worth may provide more positive responses than using extrinsic affirmations. Research further distinguishing whether self-affirmation manipulations are all alike may help to further elucidate what factors might moderate the success of self-affirmation.

Chapter 2 provided an overview of self-affirmation techniques, and there it was noted that self-affirmation techniques may also differ in whether they affect self-esteem. For example, while positive personality feedback as a self-affirmation manipulation has been found to increase state self-esteem (Fein & Spencer,1997; see also Arndt & Greenberg, 1999; Greenberg et al., 1992), value salience tasks typically have not (Galinsky, Stone, & Cooper, 2000; Spencer & Steele, 1990; cited in Fein & Spencer, 1997). This may suggest that while some self-affirmation techniques may be mediated by changes in self-esteem, others are not.

A recent paper by Schmeichel and Martens (2005) also suggests that some self-affirmations work by boosting self-esteem, while value salience manipulations appear to work through a different mechanism. Based on the Terror Management Theory (TMT; Greenberg, Pyszczynski & Solomon, 1986), Schmeichel and Martens suggest that value salience manipulations are able to reduce biased processing because they make participants' world-views salient. TMT suggests that people attempt to control anxiety and fear, evoked from knowledge of their vulnerability and inevitable death, using two psychological systems (Schmeichel & Martens, 2005). Firstly, people's self-esteem acts a buffer against anxiety, and secondly people's world-views or shared cultural beliefs and values, provide them with a sense of stability, meaning and importance. Schmeichel and Martens suggest that self-affirmations, in terms of positive feedback, can reduce defensive responses through increasing self-esteem. In contrast, value affirmations do not boost self-esteem directly, but remind participants of their world-view and by this route provide a resource to reduce the defensive response to threats. Schmeichel and Martens demonstrate that, after mortality salience, self-affirmation has the potential to reduce negatively biased processing of information that threatened participants' world-views. Furthermore, this reduction in biased

processing was not mediated by changes in state self-esteem. Not only does the work of Schmeichel and Martens highlight one of the possible differences between self-affirmation techniques, but also demonstrates how the effects of self-affirmation can be reinterpreted using competing theories (a topic discussed in more depth below).

From the perspective of self-affirmation theory, whether or not the effects of self-affirmation tasks are mediated by changes in self-esteem is not all that significant. According to Steele, both forms of affirmation ultimately act to restore self-integrity and thus act through the same mechanism (e.g., restoring perceptions of the self as adaptive and adequate). In support of this, Sherman and Kim (2005) suggest that the self-threat used in a self-affirmation task will affect what mediates the effects of self-affirmation. For example, if participants are presented with a threat to their collective self, the effects of self-affirmation might be mediated by changes on a measure of collective self-esteem. This logic could also be applied to differences between self-affirmation manipulations, with the effects of self-affirmation only detectable on measures specific to the aspect of the self that is affirmed. For example, if you affirm a person's collective self then changes might be seen on a measure of collective self-esteem. Therefore, differences between self-affirmation techniques can be incorporated into the theory. Further research examining possible differences between self-affirmation techniques may, however, shed light on further factors that mediate the effects of self-affirmation and potentially moderate the effectiveness of self-affirmation techniques.

Self-integrity: The primary motive?

Self-affirmation theory provides one version of the self-enhancement perspective, i.e., that people desire to maintain positive self-evaluations. Much research has examined self-evaluation processes separately, with self-affirmation theory being one of the few theories that has attempted to integrate these processes (Tesser & Cornell, 1991). Self-affirmation theory suggests that processes such as self-enhancing social comparison, self-serving attributions, dissonance, biased processing, degradation of out-groups and self-handicapping, among others, all serve to maintain a sense of self-integrity. Furthermore, Steele suggests that self-enhancing responses, following a threat, can be negated by an opportunity to affirm "central and valued aspects of the self" (Steele, 1988, p. 289).

Steele and Spencer (1992) claim that the desire to maintain self-integrity is the primary motive. Other motives, such as the desire for self-consistency, control or predictability, all ultimately serve to maintain self-integrity (for a similar view see Sedikides & Strube, 1997). For instance, Steele suggests that the desire to maintain self-integrity involves both seeing the self as good and positive, but also the self as adaptive, in control and stable. Thus evidence, that in some circumstances people self-verify or affirm negative self-conceptions (Swann, 1985), is also incorporated into self-affirmation theory.

The primacy of self-integrity as a self-motive is not, however, universally accepted. Examination of competing theories, such as dissonance theory, potentially provides an alternative account for the findings of the present thesis. Aronson (1992) argues that people strive for three things: (a) to preserve a sense of the self as consistent, stable and predictable, (b) a sense of the self as competent and (c) a sense of the self as morally good. The most important of these according to Aronson is self-consistency. Aronson (1992) suggests that the effects of self-affirmation can be explained more readily by dissonance theory. For example, in the context of a health message, a self-affirmation task may remind people that they are a good person and subsequently make it harder for them to rationalise a behaviour inconsistent with this knowledge. Aronson is not alone in suggesting that the effects of self-affirmation can be interpreted in terms of dissonance theory. Simon, Greenberg, and Brehm (1995) have argued that self-affirmation acts as a trivialisation manipulation, reducing the importance of a perceived threat. Alternatively, Thibodeau and Aronson (1992) suggest that self-affirmation acts to remind participants of aspects of the self that are consistent with their self-concept. Thus self-affirmation is hypothesised to reduce rationalisation and attitude change by providing a boost to perceptions of consistency, stability and control.

These alternative accounts provide plausible explanations for the effects of self-affirmation. Therefore, what evidence is there that self-affirmation is mediated by changes in self-integrity? As outlined above, according to Sherman and Kim (2005) the effects of self-affirmation may be mediated by different processes, dependent on the self-threat presented. Core to self-affirmation theory, however, is that affirmations in any domain will affirm a more global sense of self-integrity. Self-integrity is loosely

defined by Steele (1988), and though a reader is able to sense what Steele has in mind, the lack of clarity in the definition hinders operationalising and developing measures of this concept. Tesser et al. (2000) have questioned whether self-integrity simply means self-esteem. Steele, however, seems to suggest self-integrity is something more than just feelings of self-worth. Research to clarify definitions of self-integrity and develop measures of this concept would help develop a better understanding of self-affirmational processes.

Future directions

Further research is needed to test self-affirmation theory and competing explanations for the effects of affirmation manipulations. For instance, Tesser and colleagues argue that self-affirmation is one of many self-esteem regulation mechanisms, mediated by changes in implicit affect. Research examining the effects of self-affirmation, including studies in the present thesis, have demonstrated that self-affirmation does not appear to be mediated by explicit ratings of affect. The only experiment that has directly tested Tesser's claim that self-affirmation is mediated by changes in implicit affect is Koole et al. (1999) who found, contrary to self-affirmation theory, that the effects of affirming the self were mediated by changes in implicit affect. Clearly this finding needs to be replicated. If further evidence were provided that self-affirmation was mediated by changes in affect, this might call into question Steele's assumptions about the mechanism underlying the effects of self-affirmation.

Conclusions

On balance the findings of the present thesis are consistent with predictions derived from Steele's (1998) self-affirmation theory. When participants were offered an opportunity to affirm important and central aspects of the self, albeit ones unrelated to health, they subsequently processed health information in a less biased manner. This increase in message acceptance did not appear to be associated with a reduction in depth of processing, suggesting that self-affirmation allowed participants to thoughtfully consider and accept the health-risk information. Also consistent with Steele, self-affirmation did not appear to be mediated by a reduction in negative affect or an increase in coping appraisals. Although the evidence from the current research suggests that self-affirmation can reduce biased processing, the mechanism by which it

does so is unclear. Further research is needed to examine what factors might mediate the effects of self-affirmation and to directly test Steele's claims about the role of self-integrity.

The present thesis has extended previous research by demonstrating that self-affirmation can have durable effects on message acceptance and can lead to behavioural change. These findings suggest that self-affirmation may have potential as an applied technique. Likewise, self-affirmation was found to increase message acceptance of both novel and well-established health messages and was effective for those both high and low in self-esteem. However, in light of the findings of Study 4 and other research (Boney-McCoy et al., 1999; Klein et al., 2001) that have demonstrated that self-affirmation can be associated with less inductive and more biased processing, further research is clearly needed to establish what factors moderate the effectiveness of self-affirmation before it can be developed as an applied intervention.

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APPENDICES

Appendix A: Example of Self-affirmation and Control Tasks from Study 1 and 5.

STUDENT VALUES QUESTIONNAIRE

In the present study we are interested in investigating students' values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some students. That is, they may try to be honest in all they do – whether in dealing with other people or when studying or working outside university. Following are some personal values that other students have described as important to them.

Conscientious
Friendliness
Spirituality / Religiousness
Compassion
Intelligence
Hedonism (the pursuit of pleasure/happiness)
Generosity
Trustworthiness
Kindness
Creativity
Spontaneity

You are going to be asked to choose a value and write a short statement about it.

Non-affirmation task:

Please select the value that is **least** important to you, and write it in the space provided. (This value does not have to appear on list on the previous page.)

Value:.....

On the sheet provided please write a short statement (around 2-3 paragraphs) about why this principle or standard could be important to **another student**. Take a couple of minutes to think about how this value may influence their behaviours or attitudes. Please write about how they may use this value in their everyday life – at University, at home, amongst friends or in dealing with strangers. Only think about why this value might be important to another person, and **not** why it is unimportant to you.

Self-affirmation task:

Please select the value that is **most** important to you, and write it in the space provided. (This value does not have to appear on list on the previous page.) If more than one value is equally important to you then please select just one to write about.

Value:.....

On the sheet provided please write a short statement (around 2-3 paragraphs) about why this principle or standard is important to **you.** Take a couple of minutes to think about this value and how this value has influenced your past behaviours or attitudes. Please write about how you use this value in your everyday life – at University, at home, amongst friends or in dealing with strangers. If you can, try to recall and write about specific occasions on which this value determined what you did.

Alcohol, Smoking and Breast Cancer

Drinking a single alcoholic drink a day increases a woman's chance of developing breast cancer by around 6%, according to a major global study of woman's smoking and drinking behaviour. The new research, from Cancer Research UK and published in the British Journal of Cancer, estimates that alcohol accounts for around 4 per cent of breast cancers in the developed world - and around 2,000 cases each year in the UK alone. If women's alcohol consumption continues to increase, this figure is likely to rise. In contrast, smoking, which causes a third of all cancers, was not found to contribute to breast cancer.

In the past it has been extremely difficult for researchers to separate the effects of tobacco from the effects of alcohol because the more women drink the more they tend to smoke and vice versa. This is a major reason why previous work has yielded conflicting results over their impact on cancer. The sheer size of the new study, including data from around 150,000 women around the globe, allows the researchers to disentangle the two factors and make the most accurate estimates ever of the risks associated with smoking and drinking.

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Sir Richard Doll, a co-author of the study, said: "There has been a great deal of research on whether smoking or alcohol contribute to breast cancer but until now results have been confused. For the first time we have undertaken a study large enough and detailed enough to look at the separate effects of tobacco and alcohol reliably. When we did this we found that drinking, but not smoking, increases the risk of breast cancer."

Co-author Professor Valerie Beral, of Cancer Research UK's Cancer Epidemiology Unit at the Radcliffe Infirmary in Oxford, said: "This research tells us there is a definite link between alcohol and breast cancer and the evidence suggests that the more a woman drinks the greater her risk."

Every year 39,500 women and 300 men are diagnosed with breast cancer
By the age of 80 breast cancer will affect 8.8 out of every 100 women
One drink a day raises the figure for women to 9.4 cases per 100
Six drinks a day raises the figure for women to 13.3 cases per 100

The average alcohol intake for UK women has increased from about 7 grams to 8 grams per day in the last decade, but for young women the increase has been even greater. This increase in alcohol consumption could have a significant impact upon breast cancer incidence.

While women who drink are at a higher risk of a number of diseases, including cancers of the throat and liver, they are at a lower risk of heart disease and stroke than are non-drinkers. Dr Gillian Reeves, who also co-authored the report, says: "The balance between the harmful effects of alcohol on breast cancer and its beneficial effects on heart disease depend on a woman's age". It is not until after the age of 65 or so that the benefits of moderate drinking become apparent as before then the risk of breast cancer is far higher than that of heart disease.

Sir Paul Nurse, Cancer Research UK's Chief Executive, said: "Large studies of this kind are very important for dissecting the complex causes of cancer. This research reinforces advice that excessive drinking can be hazardous. It seems that women's attitudes to alcohol are changing and this can only have a negative impact on their health. It's important that we get the message out to young women that drinking too much is dangerous."

Recommendations

There are many things that you can do to look after your heart, including taking plenty of exercise and eating a healthy diet. The small benefit that alcohol brings is not large enough to recommend that those who don't drink should start. Considering the potential harmful effects of drinking, including breast cancer, it is advised that those who do drink should not exceed the Government's recommendations for alcohol consumption. These are currently:

- For women - 14 units per week.

  For example, that is 14 glasses of wine or 7 pints of beer

- For men - 21 units per week

  For example, 10 and a half pints of beer or 21 shots

(One unit of alcohol is equivalent to half a pint of beer or cider (of normal strength), 1 glass of wine, 1 measure of spirits or 1 small sherry or port.)

Contacts

Breast Cancer Campaign
Clifton Centre, 110 Clifton Street, London, EC2A 4YT
Tel: 020 7749 3701

Breast Cancer Care
Kiln House, 210 New Kings Road, London, SW6 42NZ
Tel: 020 7384 2984

Alcohol Concern
Tel: 020 7922 8667

Drinkline
0800 9178282

Alcoholics Anonymous
GSO, Po Box 1, Stonebow House, Stonebow, York, Y01 7NJ

Tel: 01904 644026

From Cancer Research UK, 2002

Images taken from: http://news.bbc.co.uk/1/hi/health/2445273.stm
http://www.bajabeachclub.co.uk/ncle.htm

Appendix C: Table of Values from VIA Classification of Strengths Scale and Corresponding Item Selected for Self-affirmation Task.

Value	Item
Wisdom and Knowledge	
Creativity (originality, ingenuity)	"Being able to come up with new and different ideas and ways of doing things is one of my strong points."
Curiosity (interest, novelty seeking)	"I am always curious about the world."
Open-mindedness (judgement, critical thinking)	"I value my ability to think critically."
Love of Learning	"I love to learn new things."
Perspective (wisdom)	"My friends value my good judgment."
Courage	
Bravery	"I must stand up for what I believe in even in the face of strong opposition."
Persistence	"I always finish what I start."
Integrity (authenticity, honesty)	"I always admit when I am wrong."
Vitality (zest, enthusiasm)	"I'm never bored." "I love what I do."
Humanity	
Love	"There are people in my life who care as much about my feelings and well-being as they do about their own." "I can express love to someone else."
Kindness (generosity, compassion, altruistic love)	"I go out of my way to cheer up people who appear down." "I am never too busy to help a friend."
Social intelligence (emotional intelligence)	"No matter what the situation, I am able to fit in."
Justice	
Citizenship (team work, social responsibility)	"I really enjoy being part of a group." "I work at my best when I am a member of a group."
Fairness	"I treat all people equally regardless of who they might be."
Leadership	"One of my strengths is helping a group of people work well together even when they have their differences." "I am very good at planning group activities."
Temperance	
Forgiveness and Mercy	"I never seek vengeance."
Humility / Modesty	"I do not act as though I am a special person."
Prudence	" 'Better safe than sorry' is one of my favourite mottoes."
Self-regulation (self-control)	"I control my emotions." "I never get side tracked when I work."

Transcendence	
Appreciation of beauty and excellence	"I experience deep emotions when I see beautiful things."
Gratitude	"At least once a day I stop and count my blessings."
Hope (optimism, future orientation)	"Despite challenges, I always remain hopeful about the future."
Humour (playfulness)	"I try to add some humour to whatever I do."
Spirituality (religiousness, faith)	"I am a spiritual person."

Note. Adapted from *Character Strengths and Virtues: A Handbook and Classification.* Peterson, C, and Seligman, M. E. P., (2004). Oxford: Oxford University Press. Copyright 2004 by Values in Action Institute. Reprinted with permission of the Values in Action Institute.

Appendix D: Example of Character Strength Self-Affirmation Task.

Classification of Character Strengths

The following questions are designed to measure your personal strengths. Please choose one option in response to each statement. If you are not sure choose the response that most closely reflects your thoughts. All of the questions reflect statements that many people would find desirable, but we want you to answer only in terms of whether the statement describes what you are like. Please be as honest and accurate as possible.

1) Being able to come up with new and different ideas and ways of doing things is one of my strong points.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

2) I am always curious about the world.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

3) I value my ability to think critically.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

4) I love to learn new things.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

5) My friends value my good judgment.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

6) I must stand up for what I believe in even in the face of strong opposition.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

7) I always finish what I start.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

8) I always admit when I am wrong.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

9) I'm never bored.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

10) I love what I do.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

11) There are people in my life who care as much about my feelings and well-being as they do about their own.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

12) I go out of my way to cheer up people who appear down.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

13) No matter what the situation, I am able to fit in.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

14) I can express love to someone else.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

15) I am never too busy to help a friend.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

16) I really enjoy being part of a group.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

17) I treat all people equally regardless of who they might be.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

18) One of my strengths is helping a group of people work well together even when they have their differences.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

19) I am very good at planning group activities.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

20) I work at my best when I am a member of a group.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

21) I never seek vengeance.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

22) I do not act as though I am a special person.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

23) "Better safe than sorry " is one of my favourite mottoes.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

24) I control my emotions.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

25) I never get side tracked when I work.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

26) I experience deep emotions when I see beautiful things.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

27) At least once a day I stop and count my blessings.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

28) Despite challenges, I always remain hopeful about the future.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

29) I try to add some humour to whatever I do.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

30) I am a spiritual person.

Very much like me	Like me	Neutral	Unlike me	Very much unlike me
❑	❑	❑	❑	❑

Appendix E: Health Information Presented in Study 3.

WOMEN, CAFFEINE AND FIBROCYSTIC BREAST DISEASE (FBD)

What is FBD?

Fibrocystic Breast Disease (FBD) is a condition that can develop in women from their late teens or early twenties, and persists until menopause. The condition is characterised by benign (non-cancerous), fluid filled lumps in one or both breasts, causing soreness and discomfort. Symptoms include the breasts being painful to touch, general sensitivity and swelling. The severity of FBD varies between patients, with some experiencing constant and severe symptoms, and others suffering intermittent bouts influenced by their hormonal cycle.

Who is affected?

Over 2,000 women are diagnosed yearly with FBD. Research suggests it is higher in those whose lifestyle has certain features: There is some suggestion that FBD is more common in women who smoke. There is good evidence that FBD is more common in women who consume caffeine.

Is it serious?

A very serious concern over FBD is that it may make women more susceptible to breast cancer. Several large scale studies have found a measurable increase in the incidence of breast cancer in women who have also experienced FBD. A further problem is that if cancer does develop, the lumpiness caused by FBD can make a cancerous growth harder to detect. Some of the symptoms of FBD may match those seen in breast cancer, leading to possible delayed diagnosis.

What is known?

Links have been found between FBD and caffeine, the stimulant drug found in coffee, tea, cola, and other beverages. In one recent study it was found that women who consumed two or more caffeinated drinks per day were significantly more likely to develop FBD than those who consumed less caffeine than this. In other research some evidence was also found that FBD was higher among women who smoked than among those who did not smoke. However, no other study has found a link with smoking.

How strong is the evidence for the link between caffeine and FBD?

The link between FBD and breast cancer is well-established. Most of the evidence also supports the link between caffeine and FBD. However, a few smaller studies have failed to find any connection between caffeine and FBD and there remains some uncertainty over the mechanism involved, given that caffeine does not accumulate but is normally excreted within several hours of consumption. It is thus unclear how a substance which does not remain in the body could cause an illness such as FBD. Nevertheless, the bulk of the evidence appears to implicate caffeine in the development of FBD, and no other explanation has been able to account for the linear relationship seen between consumption of caffeine and the increased risk of FBD observed.

What should I do?

Given the evidence of caffeine's association with FBD and the proven link between FBD and the development of breast cancer, the latest advice is that women should consume no more than 2 caffeinated drinks per day.

Given the controversial nature of the evidence concerning smoking, there is no recommendation that women should give up smoking because of concerns over FBD.

Recommendation

So overall, given the evidence, the latest scientific advice is that women should consume no more than 2 caffeinated drinks per day.

Appendix F: Examples of Participants' Thought Listings and How They were Used to Generate Statements for Study 3.

Counter-arguments. Counter-argument statements were broken down into statements attacking the source, size of the study, questioning the reliability of evidence, or talking about the benefits of drinking alcohol. For example, participants made statements such as "The sample isn't that big compared to world population, it might not be that reliable" and "What about evidence that suggests alcohol is good for you?".

Article taken seriously. Participants made statements to suggest that they thought the issue was serious. For example, two participants included the following statements demonstrating they thought the topic was genuine and serious: "This information should be more widely publicised" and "This is important, I must tell my mum about this".

Minimisation of threat. Statements demonstrating participants minimised the impact of the information were divided into those (1) where participants argued that people can not worry about everything that might be bad for them, (2) suggesting that the participants believed they were healthy in general so did not need to be concerned, (3) suggesting there are many different possible causes of cancer and there was no need to be particularly concerned about drinking. For example, two participants included the following thoughts: "I don't smoke and I exercise regularly, so I'm healthy overall" and "They say everything gives you cancer, you can't avoid everything".

Denying personal relevance. Statements attempting to deny or down play the relevance of the message were broken down into statements suggesting: (1) the message was not relevant and participants did not drink too much, (2) the message was not relevant at participants' age, (3) other students drank more or the same as the participant, (3) the participants nearly drank the recommended amount, so did not need to be concerned, or (4) participants made no reference to themselves at all.

Appendix G: Example of Strong Version of Article from Study 4. Changes from weak version highlighted.

Alcohol and Breast Cancer

Drinking a single alcoholic drink a day increases a woman's chance of developing breast cancer by around 6%, according to a major global study of woman's drinking behaviour. The new research, from Cancer Research UK and published in the British Journal of Cancer, estimates that if women in Britain stopped drinking, 2,000 deaths from breast cancer would be avoided annually.

Professor Valerie Beral of Cancer Research UK's cancer epidemiology unit said, "This research tells us that there is a definite link between alcohol and breast cancer and the evidence suggests that the more a woman drinks, the greater her risk."

Past research has been inconclusive about the role of alcohol in the development of breast cancer. The sheer size of the new study, including data from around 150,000 women around the globe, allows the researchers to make the most accurate estimates ever of the risks associated with drinking. Sir Richard Doll, a co-author of the study, said: "There has been a great deal of research on whether alcohol contributes to breast cancer but until now results have been confused. For the first time we have undertaken a study large enough and detailed enough to look at the effects of alcohol reliably. When we did this we found that drinking, increases the risk of breast cancer."

While women who drink regularly are at a higher risk of a number of diseases, including cancers of the throat and liver, they are at a lower risk of heart disease and stroke than are non-drinkers. Dr Gillian Reeves, who also co-authored the report, says: "The balance between the harmful effects of alcohol on breast cancer and its beneficial effects on heart disease depend on a woman's age". It is not until after the age of 65 or so that the benefits of moderate drinking become apparent and before then the risk of breast cancer is far higher than that of heart disease.

This research does not suggest that every drink a woman has increases her risk of breast cancer by 6%. Instead the report suggests that a woman who regularly drinks one unit a day (7 units a week) has an increased risk of 6%. While drinking an average of 2.5 units a day (17.5 units a week) will increase her risk by 15%. Current research would suggest that alcohol may increase the risk of breast cancer by raising the levels of oestrogen in the body. Oestrogen has a well-established link with breast cancer, with research suggesting oestrogen can play a role in both triggering its development and encouraging the growth of tumours (Prince Henry's Institute of Medical Research).

Sir Paul Nurse, Cancer Research UK's Chief Executive, said: "Large studies of this kind are very important for dissecting the complex causes of cancer. This research reinforces advice that excessive drinking can be hazardous." The Government's current recommendations for alcohol consumption are:

- For women - 14 units per week. For example, that is 14 *small glasses of wine or about 9 bottles of mixers* (e.g. Bacardi Breezers, Smirnoff ice).

(One unit of alcohol is equivalent to half a pint of beer or cider (of normal strength), 1 glass of wine, 1 measure of spirits)

This new research suggests that from the point of view of reducing the risk of breast cancer, women should reduce their alcohol intake as far as possible.

Appendix H: Example of Weak Version of Article From Study 4. Changes from strong version highlighted.

Alcohol and Breast Cancer

Drinking one alcoholic drink a day may increase a woman's chance of developing breast cancer by around 6%, according to a new study of woman's drinking. The new research, from the Clean Living research team, estimates that if women in Britain stopped drinking, 2000 deaths from breast cancer would be avoided each year.

Valerie Beral of the Clean Living team said, "Our research suggests that there may be a connection between alcohol and breast cancer, and that the more a woman drinks, the greater her risk."

Past research has been inconclusive about the role of alcohol in the development of breast cancer, with one recent large-scale international study, funded by the World Health Organisation (WHO), suggesting alcohol consumption has no link to breast cancer. The Clean Living researchers claim that their new study allows them to estimate the risks associated with drinking more precisely. Richard Doll, a co-author of the study, said: "There has been a great deal of research on whether alcohol contributes to breast cancer, until now results have been confused. The current study is able to look at the effects of alcohol in a new way, demonstrating that drinking may increase the risk of breast cancer."

While women who drink regularly are at a higher risk of a number of diseases, including cancers of the throat and liver, they are at a lower risk of heart disease and stroke than are non-drinkers. Gillian Reeves, who also was involved in the research, says: "The balance between the possible harmful effects of alcohol on breast cancer and its beneficial effects on heart disease depend on a woman's age". It is not until after the age of 65 or so that the benefits of moderate drinking become apparent and before then the risk of breast cancer is far higher than that of heart disease.

This research does not suggest that every drink a woman has increases her risk of breast cancer by 6%. Instead the study suggests that a woman who regularly drinks one unit a day (7 units a week) has an increased risk of 6%. While drinking an average of 2.5 units a day (17.5 units a week) will increase her risk by 15%. The Clean Living team is unable to explain exactly why alcohol might increase the risk of breast cancer. However, a small amount of evidence suggests that it raises the levels of oestrogen in the body.

Paul Nurse, head of the Clean Living team, said: "Studies of this kind are very important for understanding the causes of cancer, as well as promoting our campaign for healthy living. This research reinforces advice that excessive drinking can be hazardous." The Government's current recommendations for alcohol consumption are:

- For women - 14 units per week. For example, that is 14 *small glasses of wine or about 9 bottles of mixers* (e.g. Bacardi Breezers, Smirnoff ice).
(One unit of alcohol is equivalent to half a pint of beer or cider (of normal strength), 1 glass of wine, 1 measure of spirits)

The Clean Living research team suggests that from the point of view of reducing the possible risk of breast cancer, women should reduce their alcohol intake as far as possible. Other research teams are currently conducting further studies to establish whether alcohol does indeed play a role in the development of breast cancer.

Appendix I: Example of Debrief Sheet for Weak Version of Article in Study 4.

IMPORTANT INFORMATION
** PLEASE READ **

Thank you for completing this questionnaire. Your help is very much appreciated.

The article you read was altered for the purpose of this study, and contained inaccurate information. The information was actually based on a press release and research from *Cancer Research UK*, examining the risks of drinking alcohol on breast cancer. The Cancer Research UK study, including data from over 150,000 women from around the globe suggests there is a definite link between alcohol and breast cancer.
Other information misrepresented in the article, for example, in the following ways:

- The Clean Living research team does not exist and the actual research was conducted by Cancer Research UK
- The arguments in general for the link between alcohol and breast cancer were presented to be weaker than the Cancer Research UK report would suggest. For example, Cancer Research UK argue that their study found that alcohol does increase the risk of breast cancer and there is a definite link.
- There has been no WHO research indicating alcohol is not linked to breast cancer.
- We are unaware of other research currently research the link between alcohol and breast cancer.

If you are interested in finding out more about the actual Cancer Research UK report on the effects of alcohol on breast cancer, the address of their website is below:

http://www.cancerresearchuk.org/news/pressreleases/34385

Information about the study

The present study is investigating the impact of completing character strength questionnaires on reactions to health information. Past research has demonstrated that completing tasks that make allow people to focus on personal values can increase acceptance of a threatening health message.

The current study has been approved be the Department of Psychology, University of Sheffield Ethics Committee

If you would be interested in finding out more the current research, please email: XXXXX@shef.ac.uk

Below please find contact details of organisations that provide information about issues relating to both breast cancer and alcohol.

Thank you once again for your time and participation.

Contacts

Breast Cancer Campaign
Clifton Centre, 110 Clifton Street, London, EC2A 4YT
Tel: 020 7749 3701

Breast Cancer Care
Kiln House, 210 New Kings Road, London, SW6 42NZ
Tel: 020 7384 2984

Alcohol Concern
Tel: 020 7922 8667

Drinkline
0800 9178282

Alcoholics Anonymous
GSO, Po Box 1, Stonebow House, Stonebow, York, Y01 7NJ
Tel: 01904 644026

Appendix J. Example of Health Information Presented in Study 5.

The health benefits of fruits and vegetables

Increasing your consumption of fruit and vegetables can significantly reduce the risk of many chronic diseases. It has been estimated that eating at least 5 portions of a variety of fruit and vegetables a day could reduce the risk of deaths from chronic diseases such as heart disease, stroke, and cancer by up to 20%.

Poor diet contributes to 1/3 of all cancers, while diet and inactivity will soon over take smoking as the major cause of preventable deaths. Increasing your intake of fruit and vegetable consumption the most important cancer prevention strategy, after reducing smoking. In 1998, the Department of Health's Committee on Medical Aspects of Food Policy and Nutrition concluded that higher vegetable consumption would reduce the risk of colorectal cancer and gastric cancer. There was also some evidence that higher fruit and vegetable consumption would reduce the risk of breast cancer.

Higher consumption of fruit and vegetables also reduces the risk of coronary heart disease and stroke. A recent study found that each increase of 1 portion of fruit and vegetables a day lowered the risk of coronary heart disease by 4% and the risk of stroke by 6%. Evidence also suggests an increase in fruit and vegetable intake can help lower blood pressure.

Research suggests that there are other health benefits too, including delaying the development of cataracts, reducing the symptoms of asthma, improving bowel function, and helping to manage diabetes.

As well as the direct health benefits, eating fruit and vegetables can help to achieve other dietary goals including increasing fibre intake, reducing fat intake, help maintain a healthy weight, and substituting for foods with added sugars (as frequent consumption of foods with added sugars can contribute to tooth decay).

The message at the heart of the 5 A DAY programme - to eat at least 5 portions (400g) of a variety of fruit and vegetables each day - is consistent with dietary recommendations around the world, including those from the World Health Organization.

The reason why fruit and vegetables are so beneficial is because as well as vitamins and minerals, fruit and vegetables also contain many complex plant components called phytochemicals. Some of the vitamins and phytochemicals are also antioxidants, destroying free radicals in the body. These free radicals are known to have a role in causing cancer as well as other harmful effects.

It appears that the benefits of fruit and vegetables stem not only from the individual components, but also from the interactions between these components. Dietary supplements containing isolated vitamins or minerals do not appear to have the same beneficial effects as fruit and vegetables themselves. Indeed, in some studies, vitamin supplements caused more harm than good.

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http://www.5aday.nhs.uk/HealthBenefits