

Social cognitive explanations for 'baby brain' in pregnancy

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The candidate confirms that the work submitted is her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

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Dedication

*This thesis is warmly dedicated to
Grandad David Banks and Grandpa Victor Pownall.*

Abstract

There is a widely held perception that women have reduced cognitive abilities during their pregnancy and into the immediate postpartum period, a concept referred to colloquially as mummy brain, pregnesia, or, more commonly, 'baby brain' (Brett & Baxendale, 2001). However, the current evidence base, which spans cognitive, neuropsychological, and evolutionary perspectives, has vast inconsistencies and is generally inconclusive (Davies et al., 2018). There are also concerns with the robustness, reliability, and suitability of these research paradigms to understand 'baby brain' in its social context (Hurt, 2011). Therefore, the mixed-methods work presented in this thesis aims to investigate empirically how 'baby brain' may be better understood through a social psychological lens. This thesis starts with an overview of the chapters (Chapter 1) and a critical review of the current 'baby brain' literature (Chapter 2), before then qualitatively exploring pregnant women's first-hand accounts of their memory changes using qualitative content analysis (Study 1). The contents of pregnancy stereotypes are then investigated (Study 2, Study 3). Finally, this work investigates experimentally how stereotype threat theory (Study 4, Study 5) and objectification theory (Study 6, Study 7) may account for differences in pregnant women's memory functioning and how objectification alters perceptions of women in pregnancy (Study 8). Overall, this research found that pregnant women are stereotyped to have poorer cognitive abilities and do self-report negative changes to their memory. However, stereotype threat and self-objectification manipulations did not harm memory performance in the hypothesised ways. Taken together, this work has important implications for understanding 'baby brain' in pregnancy, while also testing the core

mechanisms of both stereotype threat theory and objectification theory in unique and understudied populations of women.

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Chapter 1: Introduction and overview

For decades, feminist psychologists have advocated for the inclusion of women and girls into psychological inquiries, in attempts to disrupt the androcentrism of mainstream psychology (Eagly & Riger, 2014; Pownall & Stainton-Rogers, 2021). This has included acknowledging the unique lived experiences of women, challenging problematic stereotypes and assumptions about women's abilities, and championing critical approaches to the study of women's experiences (Wigginton & Lafrance, 2019). In particular, feminist psychologists have also sought to resist and re-examine research agendas that perpetuate the idea that women are less cognitively able, less skilful, and at the continual mercy of their hormones (e.g., Chrisler et al., 2006; Fiske et al., 1999, 2002). As Longhurst (1997, 1999) proposes, one particularly striking example of this gender stereotyping is the notion that women are cognitively inferior during their pregnancy and into the immediate postpartum period, a concept referred colloquially as 'mommy brain', preghead, or, more commonly, 'baby brain' (Brett & Baxendale, 2001; Henry & Rendell, 2007).

To date in the literature, there have been various proposed explanations of 'baby brain', such as hormonal fluctuations, disrupted sleep, cognitive reorganisation, and changes in brain structure (e.g., Anderson & Rutherford, 2012; Davies et al., 2018; Logan et al., 2014; Ouellette & Hampson, 2019; Ziomkiewicz et al., 2019). However, while there is a lot of literature in this area, the majority of this research is generally inconclusive, with little solid conclusion drawn from the empirical evidence (Davies et al.,

2018). Further, and perhaps more problematically, the literature contains contradictions, in that some researchers find stark differences between the memory ability of pregnant women (Henry & Rendell, 2007), whereas other studies claim that there is no observable differences (e.g., Orchard et al., 2021). Therefore, the present thesis aims to address this literature, offering a seldom-heard *social* psychological account of ‘baby brain’ in pregnancy.

1.1. Thesis aims

Over eight mixed-methods studies, this thesis empirically investigates how ‘baby brain’ may be conceptualised and understood through a social psychological lens. As the literature review in Chapter 2 will later demonstrate, the vast majority of the current literature which explores women’s performance during pregnancy is dominated by cognitive, neurological, or evolutionary appraisals, with very little discussion that derives from social psychology or social cognitive perspectives.

The work in this thesis argues that the inconsistencies in conclusions drawn from this literature may be explained by the presence of social psychological phenomena, such as stereotype activation and increased gender schema salience triggered through objectification, which have not yet been considered in the unique context of pregnancy. This thesis first provides a comprehensive review of (1) the ‘baby brain’ literature and (2) the social psychological theories that may better explain cognitive changes in pregnancy than the mainstream cognitive or neuropsychological explanations (Chapter 2), before detailing eight empirical studies across four chapters that each contribute to the advancement of social psychological appraisals of ‘baby brain’ (Chapters 3, 4, 5, and 6). This thesis ultimately

aims to offer an alternative account of 'baby brain', calling into question how social cognition may afford insights into women's cognitive abilities during their pregnancy and in the period following childbirth. Therefore, the work in this thesis is guided by two core research questions:

1. Are women perceived, or stereotyped, to have poor cognitive abilities during their pregnancy, as per the colloquial concept of 'baby brain'?
2. Can social cognitive theories (namely stereotype threat theory and objectification theory) offer insights into women's 'baby brain' performance during pregnancy and early new motherhood?

This work also aimed to further understanding of how social psychological theories may account for performance differences in the unique context of pregnancy, contributing to the ongoing reappraisal of stereotype threat and objectification theories.

1.2. Overview of chapters

There are two review chapters in this thesis (Chapter 2 and Chapter 7) and four empirical chapters (Chapters 3, 4, 5, and 6). Chapter 2 provides a review of the cognitive and neuropsychological literature into 'baby brain', and introduces the two social cognitive theories that will be used in the experimental work of Chapters 5 and 6 (stereotype threat theory and self-objectification theory). The first empirical chapter of this thesis qualitatively investigates women's first-hand experiences of mood and memory changes throughout their pregnancy (Chapter 3; Study 1), before then exploring whether the perception of pregnant women as less competent than other groups is widely held by a general population (Chapter 4). Chapter 4 includes empirical investigations into explicit stereotyping of pregnant

women, using the Stereotype Content Model (Fiske et al., 2002) as a theoretical framework (Study 2) and then focuses on more latent qualitative stereotyping, using a trait generation task (Study 3). The first three studies of this thesis broadly serve to identify the contents of pregnancy-related stereotyping, with a particular focus on cognitive deficits and memory performance.

Following this, the thesis then focuses on understanding how social cognitive theories may explain pregnant women's performance deficits in memory and cognitive functioning more broadly. The remaining chapters employ online experimental methodologies. Chapter 5 starts this line of enquiry by investigating how Steele's (1997) stereotype threat theory may contribute to deficits in pregnant women's performance, when the 'baby brain' stereotype is explicitly activated. This chapter first examines how increasing the salience of the 'baby brain' stereotype may harm pregnant women's memory performance (Study 4), by making self-applicable stereotype relevance and thus interfering with cognitive performance on this task, as per the core tenets of stereotype threat theory. Then, this study is conceptually replicated, by expanding these investigations to cognitive performance more broadly (including mathematics ability and executive functioning), instead of focusing solely on memory (Study 5). In Chapter 6, the focus is then shifted to another appropriate social cognitive theory, Fredrickson and Roberts' (1997) objectification theory.

Chapter 6 covers three empirical studies which broadly assess how objectification theory may contribute further insights to the 'baby brain' stereotype. As per stereotype threat theory, objectification theory posits that

bodily objectification (i.e., focusing on one's body or physical appearance rather than performance) can trigger gender schemas, which interfere with performance and result in a performance deficit effect (Winn & Cornelius, 2020). The first study of Chapter 6 investigates how a *self*-objectification manipulation may harm pregnant women and new mother's cognitive performance by prompting gender schemas and thus triggering stereotype-consistent performance in a memory task (Chapter 6; Study 6). As per the structure of Chapter 5, I then aimed to conceptually replicate this finding (Chapter 6; Study 7). The final empirical study of this thesis then tests whether an observer objectification manipulation (i.e., prompting people to focus on physical appearance rather than performance) can impact perceptions of pregnant women's competence, in the same way that has been suggested of other groups of women (Chapter 6; Study 8).

Taken together, this work has important implications for understanding 'baby brain' in pregnancy, while also testing the core mechanisms of both stereotype threat theory and objectification theory in unique and understudied populations of women. The practical and theoretical implications, future directions, and general critique of this empirical work are explored in the general discussion of Chapter 7.

Chapter 2: Literature review

2.1. Chapter overview

As introduced in Chapter 1, 'baby brain' is the notion that women's cognitive abilities are compromised throughout pregnancy and into the immediate postpartum period. Exploring this will be the focus of the empirical work throughout this thesis. To provide some theoretical background, Chapter 2 will provide an overview of the vast literature which examines 'baby brain', across perspectives including cognitive psychology, neuropsychology, and evolutionary psychology. This literature review aims to first demonstrate the often conflicting and contradictory nature of objective investigations into women's cognitive functioning during pregnancy, thus highlighting the need for alternative *social* psychological appraisals of the 'baby brain' phenomenon. The literature review then proposes two social psychological theories which may shine light on the 'baby brain' phenomenon: Steele and Aronson's (1995) stereotype threat theory and Fredrickson and Roberts' (1997) objectification theory. Both theories uniquely investigate the relationship between social phenomenon (e.g., activation of stereotyping) and cognitive performance (e.g., memory), which makes them appropriate for investigating social mechanisms which may explain 'baby brain'. This literature review will briefly cover the theoretical underpinnings of both theories, before articulating how stereotype threat and objectification may be appropriate frameworks to (re)consider 'baby brain'. This literature will form the theoretical basis for the rest of the empirical work in this thesis.

2.2. Understanding ‘baby brain’

“Most mothers, on some level, feel torn between the pleasures, responsibilities, and pressures of children and their own need for financial or emotional resources. We know that the female brain responds to this conflict with increased stress, increased anxiety, and reduced brainpower for the mother’s work and her children”

Brizendine’s ‘The Female Brain’ (2007, p. 112)

As Brizendine illustrates, when women become mothers, they are perceived to be stressed, overworked, anxious, and cognitively less able than other people (e.g., Brett & Baxendale, 2001; Crawley et al., 2008). In pregnancy and into biological motherhood¹, women are framed by society to suffer from poorer memory recall, compromised executive functioning, and reduced attention (e.g., Brett & Baxendale, 2001; Crawley et al., 2008; Morgan et al., 2013). This perception of decreased cognitive abilities in pregnancy is colloquially referred to as ‘mommy brain’, maternal amnesia, ‘preg head’, or, more frequently, ‘baby brain’ (Brett & Baxendale, 2001). A

¹ Note that this research recognises that motherhood can occur following pregnancy, adoption, fostering, or surrogacy. These journeys into motherhood, including step-motherhood, are legitimate experiences of women’s transition to motherhood. The focus of this thesis, however, is studies that address ‘biological motherhood’ and pregnancy, due to the evidence that demonstrates how pregnancy and new biological motherhood is associated most prominently with ‘baby brain’ perceptions and allows us to directly challenge hormonal and cognitive explanations (Davies et al., 2018).

meta-analysis by Davies et al (2018) of twenty studies concluded that cognitive impairment during pregnancy is significantly poorer in pregnancy. However, this review and meta-analysis also highlighted the inconsistencies throughout this literature base.

Aligned with 'baby brain', research also demonstrates how pregnant women are perceived to be less intelligent (Morgan et al., 2013), less committed employees (Correll, et al., 2007; Jones, 2017), and overly hormonal (Longhurst, 2008). This perception is aligned with the notion that women are incompetent in the transition to motherhood (Hurt, 2011) and in need of assistance from others (Hebl et al., 2007). Pregnant women are also perceived to be at the continual mercy of their hormones (Longhurst, 1999), and face discrimination, prejudice, and benevolent sexism throughout pregnancy (e.g., Halpert, et al., 1993; Hebl et al., 2007; Johnson, 2008; Kitroeff & Silver-Greenberg, 2019; Longhurst, 1999; Masser et al., 2007; Sutton, et al., 2011). Such perceptions are arguably fuelled by the existence and promotion of negative stereotypes about pregnant women (Green et al., 1990) which suggest pregnant women are warm, caring, and maternal but also predominantly incapable and in need of assistance (Fiske, et al., 2002; Glick & Fiske, 1997), further perpetuated by the 'baby brain' perception.

The 'baby brain' phenomenon has been subject to much inquiry from cognitive, neuropsychological, and evolutionary researchers (e.g., Casey, 2000; Christensen et al., 2010; Ziomkiewicz et al., 2019). However, there are inconsistencies and concerns surrounding the robustness and conclusiveness of this literature base (e.g., Davies et al., 2018; Hurt et al., 2011). This literature review will now parse out the cognitive,

neuropsychological, and evolutionary investigations into 'baby brain', highlighting the state of the literature which aims to objectively study 'baby brain' in pregnancy.

2.2.1 Cognitive evidence for 'baby brain'

A wealth of cognitive psychologists have attempted to understand the extent to which 'baby brain' has a 'real' effect on cognitive measures, and whether these cognitive changes that women experience occur due to biological reasons (e.g., hormones, physiological changes, and differences in sleep patterns; Duarte-Guterman et al., 2019). Experimental cognitive studies have suggested that pregnancy is associated with poorer concentration, worse memory recall, and motor coordination problems (Casey, et al., 1999; Davies et al., 2018; Henry & Rendell, 2007). However, while some studies report large differences in memory ability (Brindle et al., 1991; Henry & Sherwin, 2012), others report null effects between pregnant women and controls (Orchard et al., 2021; Schneider, 1989). Similarly, some cognitive studies report large changes in pregnant women's memory on both explicit (e.g., Henry & Sherwin, 2012) and implicit (e.g., Brindle et al., 1991) tests, whereas others, again, concluded that there is no difference (e.g., McDowall & Moriarty, 2000; Schneider, 1989).

Relatedly, null or inconclusive effects plague this literature base. Despite reviews boldly claiming that 'baby brain' is a real or genuine phenomenon (e.g., Davies et al., 2018; Henry & Rendell, 2007), studies find no effect. For example, in a seminal study of pregnant women's cognitive abilities, Brindle et al. (1991) tested pregnant women's performance on memory-based cognitive tasks in comparison with non-pregnant women.

Overall, there were no performance differences on any explicit measure of memory ability. However, for first-time pregnant women (primigravid), performance was worse than non-pregnant women, but only when memory was tested implicitly (using a stem completion task). Similarly, the Personality and Total Health (PATH) Through Life Project (Christensen et al., 2010) assessed cognitive functioning longitudinally over eight years, and found no evidence of cognitive deficits during pregnancy. Zinke et al. (2021) theorised that pregnancy-related changes in cognition may be due to sleep changes, hypothesising that memory deficiencies may be a result of disturbed sleep. However, their study of 21 third-trimester pregnant women and 20 matched controls found that while pregnant women indicated subjective deteriorations in their sleep quality, this was not linked to objective impairments in memory performance. Memory performance across the two groups was also comparable. Further, a recent study by Pieters et al. (2021) also tested whether mothers and fathers differ in memory ability, both pre- and post-partum, and found no gender differences in working memory performance. The authors also found that the working memory of women in the sample did not improve or decline from pre- to post-partum.

Concerns surrounding the inconsistencies within this evidence base have been voiced in the literature; for example, Hurt (2011) argues that cognitive investigations into 'baby brain' are inconclusive and problematic. Hurt (2011) proposes "the baby brain dilemma" (p. 381), which highlights how women's lived experiences of pregnancy are often overlooked in favour of attempts to gather empirical, objective, and scientific evidence that corroborate women's self-reports. As Thornton (2014) also notes, cognitive investigations have led to a proliferation of 'baby brain' self-help books,

which appear to offer women a mechanism to 'opt out' of gendered expectations, whilst actually problematically positioning women as *responsible* for managing their pregnancy. This, as Thornton (2014) argues, reinforces gendered norms and dilutes women's agency. Beyond the wider question of whether cognitive studies into 'baby brain' are helpful in of themselves, scholars have also raised methodological concerns within this evidence base. For example, Brown and Schaffir (2019) argue that the cognitive literature which examines neural and cognitive function in pregnancy is inherently hampered by small samples of participants, unclear definitions of memory capabilities, and heterogeneous methodologies. Therefore, even when significant effects are found, they should be interpreted with caution. This calls into question the robustness and utility of purely cognitive experimental attempts at understanding 'baby brain' in pregnancy.

2.2.2 Neuropsychological evidence for 'baby brain'

Running parallel to the cognitive literature, neuropsychologists have also studied 'baby brain' in some depth (e.g., Grattan & Ladyman, 2020; Kinsley & Lambert, 2006). This has included investigations into maternal brain neuroplasticity (e.g., Dahan, 2021), both during pregnancy (e.g., Hoekzema et al., 2017) and into new motherhood (Barba-Müller et al., 2019), changes in grey matter during pregnancy (Luders et al., 2020), hormonal pregnancy changes (Grattan & Ladyman, 2020), brain tissue changes (Oatridge et al., 2002) and consequent broader neurobiological changes that occur during pregnancy (Lambert & Kinsley, 2012; Voltolini & Petraglia, 2014). For example, Luders et al. (2020) evaluated the literature

on grey matter gain after childbirth, comparing the immediate postpartum period and later after giving birth, and note that ‘baby brain’ (i.e., in pregnancy) may differ from ‘mommy brain’ (i.e., during early motherhood). The authors note that some studies show an increase in grey matter from 3-4 months of pregnancy compared to weeks after childbirth (Kim et al., 2010), and other studies show a decrease in brain size during pregnancy that is reserved by 6 months postpartum (Oatridge et al., 2002). However, other studies also show prolonged brain disruption up to two years postpartum (Hoekzema et al., 2017). Luders et al. (2020) also highlight the inconsistencies in neuropsychological studies of pregnancy brain changes, due to factors such as fluctuating sample sizes and inconsistencies in data collection methods.

While the majority of literature finds support for the negative effects of pregnancy on memory and cognitive performance, some neuropsychological literature suggests that women’s cognition is *improved* throughout pregnancy. For example, Kinsley and Lambert (2006) suggest that pregnancy and early motherhood is a time of heightened neuroplasticity which means that mothers’ have ‘bigger’ and ‘better’ brain capabilities. This perception is also perpetuated in Ellison’s (2006) popular science book ‘The Mommy Brain: How Motherhood Makes Us Smarter’. In an analysis of the messages communicated in Ellison’s text, Thornton (2014) explains that these scientific claims promote the concept that good motherhood has a “biological basis” (p. 278). Indeed, in recent years, scholars have voiced concerns about cognitive investigations into ‘baby brain’, noting issues such as inconsistencies in data collection methods across studies (Luders et al., 2020) and challenges in capturing ‘real world’ cognitive multitasking in

parenthood (Ablow & Measelle, 2019). These inconsistencies in neurological evidence may be contextualised by Laurent's (2019) concerns over pregnancy neuroimaging methodologies. In their discussion of the challenges in characterising 'mommy brain', Laurent (2019) notes that issues such as lack of ecological validity in neuroimaging studies means that neuropsychologists' attempts to pinpoint the complexities of the maternal brain "inevitably result in a less than complete picture of what we wish to visualize the parental brain in action" (p. 94). Therefore, as with the cognitive literature, neuropsychological investigations too are littered with inconsistencies and concerns surrounding the conclusiveness of the evidence base.

2.2.3. Evolutionary evidence for 'baby brain'

Some scholars have also adopted an evolutionary approach to the study of 'baby brain', suggesting that cognitive decline in pregnancy is a genuine phenomenon that serves a unique set of adaptive functions during pregnancy. For example, Anderson and Rutherford (2012) aimed to update Henry and Rendell's (2007) meta-analysis by offering an alternative evolutionary account of 'baby brain'. The authors argued that cognitive changes in reproductive periods may be attributed to "cognitive re-organisation", in which pregnant women are adaptively more attuned to pregnancy-related or child-rearing related activities and stimuli, which shifts focus away from other cognitive functions.

More recently, Ziomkiewicz et al. (2019) proposed the 'cognitive costs of reproduction hypothesis', which suggests that women experience reduced cognitive abilities during pregnancy because their attention shifts away from

tasks at hand, and towards to the developing foetus instead. Similarly, Christensen et al. (1999) also showed that there were no differences in the cognitive ability of pregnant women versus controls on tasks such as attention, recall, and stem completion memory tasks. However, the authors found that pregnant women recognised more pregnancy-related words in an incidental recognition task, compared with neutral or anxious words. The authors suggested that changes in cognition during pregnancy thus serve an adaptive function, which enables women to navigate demanding requirements of pregnancy.

2.2.4. The need for social cognitive appraisals

Given the inconsistencies and problematic evidence within the cognitive, neuropsychological, and evolutionary literature, and the inability for current explanations to reach a conclusive standpoint, there may be value in applying a social psychological perspective to provide further insights into this phenomenon (e.g., Crawley et al., 2008; Hurt, 2011; Pownall, 2019). This is an approach which, to date, has been notably absent from this literature base. So far in the literature, social psychologists have focused on studying the pervasive levels of maternity prejudice (Longhurst, 1999; Masser et al., 2007), benevolent sexism (Hebl et al., 2007; Sutton, et al., 2011), and discrimination (Halpert, et al., 1993; Johnson, 2008; Kitroeff & Silver-Greenberg, 2019) that women face during pregnancy. This, as some social psychological research argues, is fuelled by the existence and promotion of negative stereotypes about pregnant women (Green et al., 1990; Valiquette-Tessier et al., 2019), which suggest pregnant women are warm but incapable (Fiske, et al., 2002; Glick & Fiske, 1997). These

perceptions have important consequences; for example, research shows that pregnancy discrimination leads to negative treatment in the workplace (Bragger et al., 2002; Fox & Quinn, 2015; Little et al., 2015, 2018) and increased postpartum depression symptoms (Hackney et al., 2020).

However, given the implications that pregnancy perceptions have on women and baby's health (Hackney et al., 2020), it is important to directly address how social psychological theories may help to understand 'baby brain' in pregnancy. In providing a social cognitive perspective to this ongoing discussion, this will also offer an account that acknowledges social context, rather than adopting a more paternalistic view of cognition throughout pregnancy. This will also acknowledge that cognition in pregnancy should be regarded in its *social* context, rather than purely a product of biology. Indeed, as Bleier (1978) notes, biological explanations of social phenomena are generally widely accepted (and, indeed, preferred), because they instil a sense of order and structure and are perceived to be reliable (see also Eliot, 2019; Hoffman & Bluhm, 2016; Persson & Pownall, 2021). In this sense, biological claims have wide popular appeal because they are thought to reflect things as they "really are" (Fine, 2013). However, as Fine (2008) and others have argued, it is important to provide competing accounts, to avoid biological determinism and scientific paternalism.

Some social psychological work has already begun to unravel the tightly wound myths that cognitive, neuropsychological, and evolutionary psychology have perpetuated about women's experiences. For example, Shahvisi (2020) provides a useful social reappraisal of 'nesting' behaviours during pregnancy, calling into question the supposedly hormonally

determined behaviour of preparing a space for a baby during pregnancy. In her reappraisal, Shahvisi (2020) offers various social explanations of this pregnancy behaviour that go beyond the purely biological, including stressing the contribution that gender stereotyping and pervasive gender norms play in pregnancy related behaviours. Similarly, Chrisler et al. (2006) adopted a social comparative approach to women's experiences of premenstrual syndrome (PMS), arguing that self-serving biases contribute to the "cultural stereotype" of PMS.

There is a small but growing body of literature which directly tests how social explanations may contribute to the 'baby brain' phenomena. Most notably, Crawley et al. (2008) attempted to empirically assess whether perceived cognitive impairments during pregnancy are a product of stereotyping, or a real decline due to organic, physiological changes. The authors concluded, following use of both self-report measures and cognitive tasks, that pregnant woman generally rate their cognitive abilities as worse than pre-pregnancy despite only mild differences between the groups on the memory tasks. However, the pregnant participants only performed worse than non-pregnant participants in two performance measures (speed of language processing and attentional switching) from a range of objective measures (such as immediate, prospective, and delayed memory recall, efficacy of language processing, planning ability, organisation, and selective and divided attention). This suggests that while there is a mild performance difference in cognitive tasks, favouring non-pregnant participants, the perceived difference is greater than the actual effect. This provides initial evidence for the contribution of social stereotypes to the 'baby brain' phenomena.

To summarise, this literature review has appraised the ‘baby brain’ literature and noted the utility of adopting a social psychological perspective on this area of study. Now, this literature review will focus on two prominent social psychological theories that may help in understanding the phenomenon of baby brain during pregnancy: stereotype threat and objectification theory. These theories both operate via stereotype activation, which can impact quantitative performance.

2.3. Stereotype threat theory

One social cognitive theory which may provide insights into ‘baby brain’ *stereotype threat theory* (Steele, 1997; Steele & Aronson, 1995). This theory suggests that exposure to information concerning self-applicable negative stereotypes undermines performance on tasks associated with that stereotype (Schmader et al., 2008; Steele, 1997; Steele & Aronson, 1995; Wakefield et al., 2012). According to stereotype threat theory, when people fear that their behaviours will confirm a negative stereotype about a group that they are a member of, this worsens performance in the stereotyped domain (Steele, 1997; Steele & Aronson, 1995). For example, exposure to explicit gender-mathematics stereotype-based information, including *women are poorer at mathematics*, (Martens et al., 2006; Spencer et al., 1999) can induce women’s performance concerns (e.g., Doyle & Voyer, 2016; Shapiro & Neuberg, 2007), prompting a “state of self-evaluative threat” (Koenig & Eagly, 2005, p. 489), which worsens performance in this domain, compared with controls (Schmader et al., 2008).

Researchers have found stereotype threat effects related to race and academic performance (Gonzales et al., 2002; Steele & Aronson, 1995), social class and standardised tests (Spencer & Castano, 2007), age and memory (Hess, et al., 2003) and gender and math performance (Ambady et al., 2004; McIntyre, et al., 2003; Pronin et al., 2004; Spencer et al., 1999). These findings have also been applied to threatened performance in tasks such as memory (Beilock et al., 2007; Hess, et al., 2003; Levy, 1996), mental rotation (Moè & Pazzaglia, 2006) and anagram completions (Wakefield et al., 2012). Further, stereotype threat effects have been found when stereotype information is both explicit (Spencer et al., 1999) and when the stereotype is communicated more implicitly (Smith & White, 2002).

Stereotype threat theory has important real-world implications for stereotyped or stigmatised groups. For example, research has evidenced negative consequences associated with exposure to a stereotype threat, such as lower career aspirations in counter-stereotypical areas (Davies et al., 2005), higher task-related anxiety (Bosson et al., 2004), feelings of dejection (Keller & Dauenheimer, 2003) and dissociation with the stereotyped group (e.g., Davies et al., 2005; Major et al., 1998). As well as social-cognitive evidence, Vick et al. (2008) also provide evidence for a biopsychosocial explanation, arguing that responses to stereotype threatening conditions can be indexed on a spectrum from 'threat' to 'challenge', depending on the nature of the task and the in-group in question. In Vick et al.'s (2008) work, when a difficult maths test was described as 'gender biased', women exhibited a 'threatened' motivational state, whereas when the test was described as gender-fair, women showed physiological 'challenge' markers. These physiological responses are

indexed by differences in heart rate, cardiac output, and ventricular contractility. Challenge/threat tasks are often goal-directed and require cognitive-behavioural responses (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996).

2.3.1. Mechanisms underpinning stereotype threat

There has also been much debate surrounding the social cognitive *mechanisms* that cause stereotype threat effects to occur. For example, stereotype threat has been linked to increased performance anxiety (Bosson et al., 2004; Osborne, 2001, 2007) arousal (Ben-Zeev et al., 2005; Blascovich et al., 2001), and stress (Sherman et al., 2009). Generally, there are two dominant approaches related to the mechanisms that underpin stereotype threat effects (see Pennington et al., 2016, for a useful review). For example, Schmader and Johns (2003) suggest that stereotype threat effects occur due to overload on *working memory* (i.e., the 'working memory approach' or 'working memory interference'). This approach posits that a stereotype threat manipulation prompts threat-related negative thoughts, which compete for working memory resources with the task at hand, and this harms performance. This is related to the concept of cognitive load, which suggests that stereotype threat places higher demand on mental resources, which depletes performance (Rydell et al., 2014). For example, if girls are overly concerned with their performance on a maths test in light of a negative stereotype activation, thoughts of this stereotype (including suppression of negative thoughts, self-monitoring of performance, and anxiety) can mean that they underperform on the task at hand (see also Schmader et al., 2008).

Contrastingly, the *mere effort approach* (e.g., Jamieson & Harkins, 2007, 2009) suggests that a stereotype threat increases motivation to disprove the negative stereotype, energising performance, and increasing reliance on *pre-potent* (i.e., dominant and well learned; McFall et al., 2009) responding. In other words, when under a stereotype threat, the goal to overcome the stereotype potentiates a well-learned and habitual response (Grandjean & Collette, 2011; McFall et al., 2009). Therefore, if the performance measure is not aligned to reliance on pre-potent responding, participants under a stereotype threat underperform (Davies et al., 2016). An integrated process model developed by Schmader et al., (2008) attempted to blend several accounts for stereotype threat into one single overarching model (including working memory interference, motivation and anxiety). In this model, it is argued that stereotype threat disrupts performance via a) heightened stress, which impairs processing, b) self-monitoring of performance, c) suppression of negative thoughts. These three mechanisms each generally consume cognitive resources and thus impair performance on the task at hand. However, the central component in the model, which lies most proximal to performance itself, is working memory interference or overload.

2.3.1.1. Identification with the threatened domain

One factor which affects stereotype threat effects is an individual's motivation to avoid confirming the stereotype to be true (Logel et al., 2012). Identification with the domain under threat is of clear importance to activate stereotype threat effects, in that motivation to disprove stereotypes in an unvalued domain is likely to be lower. Stereotype threat effects occur when the individual under threat places high importance on their performance in

the domain (Hess et al., 2009; Nguyen & Ryan, 2008; Shapiro & Neuberg, 2007). Stereotype threat effects are found when performance in the domain is highly valued (Schmader & Beilock, 2012). For example, if women do not highly identify with the domain of maths ability, stereotype threat theorists would reason that these women will not be as affected by a threat in this domain, such as the classic 'women as poorer at mathematics' threat. This view is supported by various empirical studies that demonstrate how high mathematics identifying women are more affected by a stereotype threat in this domain compared with low maths identifying women (e.g., Lesko & Corpus, 2006).

The threat of underperformance motivates individuals to disprove a stereotype (Davies et al., 2016; Jamieson & Harkins, 2007), and preoccupation with the consequence of confirming a negative stereotype therefore interferes with one's ability to perform. Jamieson and Harkins (2010) also note that belief salience is a key factor in eliciting stereotype threat effects. The authors theorise that the stereotyped individual must place some level of personal value on their performance in the targeted domain in order for performance to be affected. Research has also suggested that conditions which activate stereotype threat affect performance by decreasing performance expectations (Cadinu et al., 2003) and increasing self-doubt (Steele & Aronson, 1995).

2.3.1.2. Identification with the threatened identity

Stereotype threat effects are also particularly harmful when they target an *identity* or social group that is integral to one's overall sense of self (Shih et al., 1999). Investment in the social identity that is targeted by the

threat, therefore, is another important moderator (Brown & Pinel, 2003; Nosek et al., 2002). Individuals must identify highly with the in-group that is the target of the threat for the stereotype threat to harm performance (Schmader & Johns, 2003). Therefore, women under a negative math stereotype threat will only be negatively affected by the threat if the in-group (i.e., being a woman) contributes a significant portion of one's overall self-identity. For example, if 'being a woman' is not highly valued, low-identifying women may not be harmed by a stereotype that threatens women as stigmatised social group. This is echoed by Shapiro and Neuberg's (2007) Multi-Threat Framework of stereotype threat, which stresses that threats must be rooted in 'one's overall self-construal' to be most effective (Bergeron et al., 2006); Pennington et al. (2016) found that when under a self-as-target and group-as-target threat, participants' performance was worse when tested alone, compared with testing sessions in single-sex groups. This is in line with the Multi-Threat Framework (Shapiro & Neuberg, 2007) of stereotype threat, which makes a crucial distinction between stereotypes that threaten '*group-as-target*' versus '*self-as-target*' stereotypes.

2.3.2 Stereotype threat and publication bias

It is important to note here that, in recent years, there have been concerns of reported publication bias that pollutes the stereotype threat literature (Flore & Wicherts, 2015; Zigerell, 2017), such that only positive effects in support of the stereotype threat effect are published, and null effects are relegated to the 'file drawer'. These concerns have been amplified given the recent reappraisal of stereotype threat theory in relation

to the replication crisis (e.g., Finnigan & Corker, 2016; Forscher et al., 2019; Ganley et al., 2013; Jurs et al., 2019; Pennington et al., 2019), with some researchers finding null effects for replication attempts of classic stereotype threat studies (e.g., Ganley et al., 2013; Stoet & Geary, 2012). As Lewis and Michalak (2019) note, many of the recent failed replications in stereotype threat work have focused specifically on the gender-math performance effect (e.g., Finnigan & Corker, 2016; Ganley et al., 2013; Stoet & Geary, 2012).

In response to this, Lewis and Michalak (2019) suggest that stereotype threat effects may be difficult to replicate in modern times due to the dissipation of pervasive negative stereotypes about women's math abilities in comparison to men. Therefore, it may be suggested that the recent failed stereotype threat experiments may reflect the *weakening* of stereotypes in contemporary society, rather than a lack of theoretical grounds of the theory itself. To date, the majority of stereotype threat re-appraisal work has concentrated on replicating the math-gender and race-intelligence stereotype-performance combinations (although, for notable exceptions, see Kaye et al., 2018; Pennington et al., 2018). However, there has been a lack of studies that *extend* the enquiries of the experimental paradigm to test other equally pervasive stereotypes, such as the 'baby brain' stereotype. With this logic, there remains a need for experimental social psychology to assess the negative performance effects that may exist due to activation of other more persistent stereotypes, beyond these classic stereotype-performance domains. For example, while general gender stereotype effects related to women's math performance may be dissipating over time, research should further stratify this demographic group to assess more nuanced gendered stereotypes and their effect on women's

performance. This will contribute to the ongoing reappraisal of the utility of stereotype threat as a theory that can explain underperformance in stereotyped tasks.

2.3.3. Stereotype threat as an explanation to ‘baby brain’

While stereotype threat has been retested extensively in recent years with a particular focus on the ‘girls are poorer at mathematics’ stereotype, to date no research has investigated stereotype threat as a potential explanation of the ‘baby brain’ perception. Memory performance has been found to be affected by a stereotype threat manipulation in previous experimental work (Beilock et al., 2007), which suggests that this paradigm may be useful in understanding ‘baby brain’ effects. Therefore, the work in this thesis (Chapter 5) aims to test whether the inconsistencies in seemingly objective inquiries into ‘baby brain’ can be explained by stereotype threat theory. In theory, stereotype threat is a wholly compatible explanation to the perception of women as cognitively less able throughout pregnancy and into motherhood, because it makes the crucial connection between social perceptions and observable, quantitative performance. However, importantly, this theory has not yet been tested. Indeed, any social psychological work which assesses any potential social, cultural, or societal explanations to ‘baby brain’ remains entirely in its infancy (Crawley et al., 2008).

Therefore, this thesis aims to explore empirically whether activation of the ‘baby brain’ stereotype itself can harm objective performance on cognitive tasks, in both pregnant women and new mothers, when compared with a never-pregnant female control. This thesis is centred predominantly

around the effects of stereotype *activation* as well as the consequences of *application* of stereotypes from an observer's perspective (Chapter 5).

Activation is the process of making a stereotype salient and self-relevant, in the context of stereotype threat theory. In contrast, application of stereotypes refers to how these stereotypes are then used, or applied, to assess the abilities or traits of other people (Gilbert & Hixon, 1991). Not all stereotypes that are activated are necessarily applied (Glock & Krolak-Schwerdt, 2014). This thesis will explore how activation of the 'baby brain' stereotype affects performance (activation) and also how application of this stereotype may affect perceptions of women in pregnancy (application). Beyond stereotype threat theory, there are also other theories that may equally contribute to understanding a social psychological perspective on baby brain. One alternative theory, that will now be discussed in this literature review, is Fredrickson and Roberts' (1997) Objectification Theory.

2.4 Objectification theory

Stereotype threat effects occur when resources are depleted by the presence of a negative self-applicable stereotype. There is also research which shows how cognitive performance suffers when gendered group membership is made salient via an *objectification* manipulation.

Objectification Theory suggests that due to the implicit sense of body inspection that exists in modern society, women are constantly socialised by society to view themselves as more object-like and thus less human (Fredrickson & Roberts, 1997). Indeed, for women, continual and critical appearance scrutiny is an entrenched feature of modern society (McKinley, & Hyde, 1996). Research demonstrates that women are regularly objectified

in the media (Harsey & Zurbriggen, 2020; Zimmerman & Dahlberg, 2008), popular culture (Gerding Speno, & Aubrey, 2018; McKee, 2005; Rodgers, & Hust, 2018) and online (Mikorski, & Szymanski, 2017). For example, the average female university student notices herself or other women being sexually objectified an average of nearly twice a day (Holland & Haslam, 2016). Objectification theory has been considered as being synonymous with sexualization of women (e.g., Vaes et al., 2011), appearance focus or appearance monitoring (e.g., Heflick & Goldenberg, 2009), and explicit appearance judgements (e.g., Strelan & Hargreaves, 2005).

Self-objectification refers to when this objectification is *internalised* by women which manifests behaviourally as a preoccupation with physical appearance, body shame, and appearance anxiety (Fredrickson et al., 1998). Self-objectification occurs when women internalise the heteronormative perspective that their personal value derives from their value as sexual, physically attractive objects to be gazed upon, and thus inspect their own bodies critically (Tiggemann & Lynch, 2001). The (self-) objectification of women consequently leads to perceptions of women as less 'human', less competent, and less moral (Heflick et al., 2011), and is thus associated with a plethora of negative outcomes (Calogero et al., 2011; Tiggemann & Slater, 2015). For example, self-objectification has been found to predict body shame, which in turn predicts depressive symptoms and dieting (Tiggemann & Slater, 2015).

Importantly, self-objectification theory shows how focusing on women's appearance serves to deplete women's cognitive resources, which thus leads to impairment on cognitive tasks (Hebl et al., 2004; Kahalon, et

al., 2018; Quinn, et al., 2006). In a classic portrayal of the impact that self-objectification has on cognitive outcomes, Fredrickson et al. (1998) tested the impact of self-objectification on women's mathematics performance. Participants completed a mathematical test whilst wearing either a swimsuit (thus eliciting self-objectification) or a jumper (control condition). For women whose appearance was most salient, in the swimsuit condition, they later performed significantly worse on the maths test. Importantly, this effect occurred only for female participants and the same effect did not replicate for men, which suggests that the performance deficit effects were a result of activated gender schemas that were associated with appearance. In theory, self-objectification theory may explain cognitive underperformance by pregnant women in memory tasks, if women are inadvertently self-objectified throughout their pregnancy. However, there is a lack of literature which considers the nature and consequences of self-objectification in *pregnancy* specifically.

2.4.1. Mechanisms underpinning self-objectification

As with stereotype threat theory, there are two related competing approaches to the social mechanisms that drive the effect that objectification has on cognitive performance. Similar to the working memory approach of stereotype threat, one approach to objectification proposes that appearance concerns, which are associated with body appraisal and body focus (Tylka & Calogero, 2011), consume women's 'cognitive resources'. As Schmader et al. (2008) proposed for stereotype threat theory, this performance deficit effect can occur due to self-monitoring of performance, anxiety, and suppression of negative thoughts. The activation of appearance concerns

may also lead to mind wandering and self-consciousness, which thus harms performance on cognitive tasks (e.g., see a systematic review by Winn & Cornelius, 2020). This effect likely results from altering allocation of attention, whereby objectification prompts women to devote attention to appearance evaluation, which distracts from the ability to perform well at the cognitive task at hand (e.g., Tiggemann & Boundy, 2008).

Secondly, researchers have proposed that state self-objectification is inherently linked to gender schema activation (Kahalon et al., 2018), which increases the salience of gendered group membership, which in turn increases salience of negative gender stereotypes. As Winn and Cornelius (2020) explain, “as state self-objectification draws awareness to the body, it also draws awareness to gender” (p. 10). In an elegant demonstration of this, Saguy et al. (2010) showed how that women who were videotaped from the neck down spoke less than women videotaped from the neck up, which indicates how state self-objectification increases conformity to gender norms roles and gender schema activation. These two competing mechanisms largely reflect the stereotype threat literature, whilst further elucidating the gendered aspect of objectification in women.

2.4.2. Self-objectification as an explanation to ‘baby brain’

Self-objectification has also been found to impair women's cognitive performance, a finding which has demonstrated robustness across different groups of women in different testing contexts (Fredrickson et al., 1998; Gay & Castano, 2010; Gervais et al., 2011; Hebl et al., 2004; Kahalon et al., 2018). Therefore, as with stereotype threat theory, this approach may be a useful framework to explore factors that impact ‘baby brain’ in pregnancy.

Winn and Cornelius (2020) provide a useful recent systematic review of this effect, demonstrating the robustness of the effects of objectification and its relationship with decreased cognitive ability. Moreover, self-objectification has been found to impede performance on a number of cognitive outcomes, including the Stroop test (Quinn et al., 2006), a Letter Number Sequencing task (Gay & Castano, 2010) and a Sustained Attention to Response Task (Guizzo & Cadinu, 2017), owing to the ‘cognitive tax’ of self-objectification (Aubrey & Gerding, 2015). In experimental research, self-objectification has been manipulated in different ways. For example, Gay and Castano (2010) videotaped participants while they walked down a hallway, whereas others (e.g., Calogero, 2013) have implemented a writing task designed to prompt a state of self-objectification, i.e., by asking participants to write about a time that they felt objectified.

Some research has begun to investigate objectification in the context of pregnancy. For example, Heflick and Goldenberg (2014) demonstrated how pregnant women are regular targets of *literal* objectification. This is exacerbated by the colloquial view of pregnant women as a “human incubator” or as a “womb for rent” (Beech et al., 2020). However, objectification theorists have stressed that the impact of objectification can also be more insidious and subtle (Calogero et al., 2011). Therefore, the transition to and through biological motherhood is a site of amplified body image concerns, including the negative impacts of objectification (Beech et al., 2020). This increased body surveillance likely impacts women’s self-concept, views of their own abilities, and relationship with their bodies, which is echoed by the research which shows that pregnant women report higher levels of body dissatisfaction (Duncombe et al., 2008; Skouteris et al., 2005),

eating disturbance, and depressive symptoms (Beech et al., 2020; Rodgers et al., 2018), compared with other groups.

2.4.3. Stereotype threat and objectification theory

Self-objectification shares much of the same social cognitive mechanisms that underpin stereotype threat theory, because they both rely in part on the dominant paradigm in social psychology - social cognition. As Figure 2.1 demonstrates, both objectification theory and stereotype threat theory focus on how internalisation of self-applicable stereotypes may harm performance in stereotype-relevant tasks. As discussed above, stereotype threat is thought to occur when people fear that behaviour will confirm a negative stereotype about a group that they are a member, and thus work to overcome this stereotype, which in turn, inhibits performance (Steele, 1997; Steele & Aronson, 1995). State self-objectification is also inherently linked to gender schema activation (Kahalon et al., 2018), which increases the salience of gendered group membership, which in turn increases salience of negative gender stereotypes. As Winn and Cornelius (2020) explain, “as state self-objectification draws awareness to the body, it also draws awareness to gender” (p. 10). In an elegant demonstration of this, Saguy et al. (2010) showed how that women who were videotaped from the neck down spoke less than women videotaped from the neck up, which indicates how state self-objectification increases conformity to gender norms roles and gender schema activation. This is also echoed by the stereotype threat literature as stereotype threat effects have been found in studies where the activation of stereotypes is both explicit (Spencer et al., 1999) and more subtle (Smith & White, 2002).

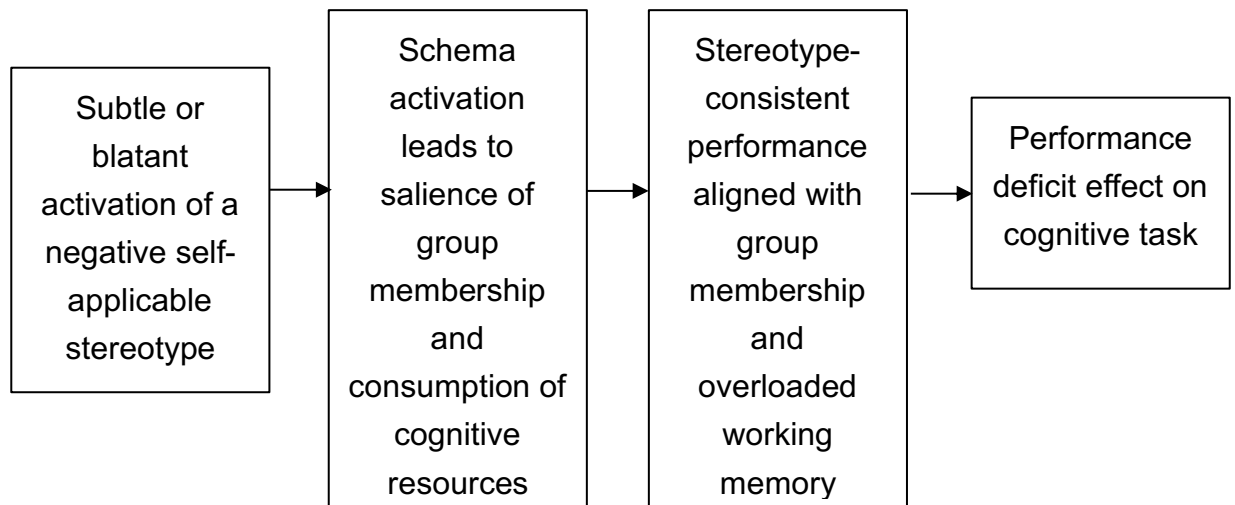


Figure 2.1. Theoretical model that underpins stereotype threat and objectification theory

2.5. Overview and conclusion

In this literature review, two core theories from social psychology have been introduced: Steele and Aronson's (1995) Stereotype Threat Theory and Fredrickson and Roberts' (1997) Objectification Theory. These theories both rely on the fundamental principle that increased salience of group membership can activate group-consistent schemas, consume working memory causing a 'cognitive load', and thus prompt stereotype-consistent under-performance. Objectification theory applies this principle in the context of how body surveillance and inspection can activate gender schemas, whereas stereotype threat theory applies a broader perspective, focusing generally on how stereotype activation can harm performance (Kahalon et al., 2018). Therefore, as Kahalon et al. (2018, p. 11) explain, "the reported effects of state self-objectification on women's cognitive performance might stem from stereotype threat". Therefore, both of these

theories share underlying mechanisms, and thus are suitable to be studied together.

2.5.1. Link to Chapter 3

The empirical work in this thesis will test the extent to which either or both theories can be applied to the 'baby brain' stereotype. First, this thesis will cover two studies that identify and confirm the presence of pregnancy-related stereotypes (Chapters 3 and 4), before then testing experimental manipulations of stereotype threat and objectification theory as explanations of 'baby brain' in pregnancy (Chapters 5 and 6, respectively).

Chapter 3: Do women self-report memory and mood changes in pregnancy?

3.1. Chapter overview

The literature review in Chapter 2 synthesised the evidence which investigates the cognitive abilities of pregnant women and new mothers', compared with other groups. Despite the prevalence of research in this area, there is a lack of studies that take a *social* psychological approach to understanding how pregnant women and women in the postpartum period experience memory changes. Beyond this, there is also a particularly notable absence of studies which employ qualitative methodologies in this literature. The first study of this thesis aimed to fill this gap in the literature, by investigating women's first-hand accounts of their memory and mood changes in pregnancy. This study aimed to centre women's anecdotal accounts, to ensure that the future work in this thesis is informed by self-reported experiences. In Study 1, pregnant women and new mothers were asked if they have experienced changes to their memory and mood and were provided with a free textbox to elaborate on their responses. The textual data were then analysed with qualitative content analysis, using a combination of deductive coding as well as inductive open coding. Overall, the analysis generated four overall typologies: two typologies of self-reported memory changes in pregnancy ('*short-term memory lapses*' and '*chronic memory fog*') and two typologies of self-reported mood changes ('*mood instability*' and '*low mood and parenting anxiety*'). These typologies represent unique profiles of the memory and mood changes in that women experience in pregnancy and confirm that negative memory changes (i.e., 'baby brain') feature in women's own testimony of their pregnancy.

3.2. Introduction

Pregnancy is a time of immense change, turbulence, and readjustment. There is a vast literature which demonstrates how women navigate changes prompted by their pregnancy, noting experiences such as feeling a loss of autonomy (Barclay et al., 1997), heightened and sudden mood changes (Li et al., 2020; Ross et al., 2004), and social identity changes (Little et al., 2018). There is also a large evidence-base which assesses women's quantitative cognitive changes throughout their pregnancy, empirically testing the colloquial concept of 'baby brain' (Brett & Baxendale, 2001). However, the majority of this research employs quantitative, correlational designs. Quantitative studies have evidenced how pregnancy is associated with changes such as increased mood instability (Li et al., 2020), more depressive symptoms (Keepanasseril et al., 2021), and impaired memory functioning, as per the 'baby brain' or 'mommy brain' stereotype (Brett & Baxendale, 2001).

There is a plethora of literature which assesses objective changes to women's memory (e.g., see a review and meta-analysis by Davies et al., 2018) and mood (Ross et al., 2004) during their pregnancy. However, the quantitative nature of these enquiries means that the nuances of mood and memory changes are not fully captured. There is a small body of literature that investigates women's first-hand accounts of their memory changes in pregnancy. For example, Parsons and Redman (1991) reported that 82% of a sample of 236 primiparous women reported experiencing cognitive changes during their pregnancy and into the postpartum period. Similarly, Crawley (2002) showed how some women self-reported poorer cognitive

ability in their pregnancy. The self-report literature, compared with correlational or experimental studies, remains in its infancy.

Given how both self-reported and objective mood and memory changes are interrelated in pregnancy (Mazor et al., 2019; Williams et al., 2015), there is value in assessing first-hand accounts of these two constructs together. In doing so, this will ensure that: (1) there are no memory and mood changes that women experience in pregnancy that are 'missed' or not captured by quantitative investigations, (2) women's self-reported experiences are centred within prenatal research (Staneva et al., 2015) and (3) the findings of quantitative evidence in the literature is corroborated (or, indeed, contested) by women's first-hand accounts. Qualitative enquiries are also necessary given the inconsistencies in much of the existing literature (see Davies et al., 2018). In order to investigate women's first-hand accounts of their pregnancy-related memory and mood changes, in Study 1, women's anecdotal responses to free-text responses about their memory and mood changes in pregnancy were investigated.

3.3. Study 1

To achieve this, Study 1 adopted a qualitative content analysis approach. Qualitative content analysis (QCA) of textual data gathered from online surveys can be a rich source of information, offering a 'wide-angle lens' on a topic (Toerien & Wilkinson, 2004). As Braun et al. (2020) discuss, online surveys that collect textual responses also have the benefit of wider inclusivity and accessibility, by reaching more people and allowing research to go beyond "usual suspects" (p. 4), i.e., groups of participants who are typically 'heard' in psychology research. It can also be a more inclusive form

of data collection, which is useful for the present study, because it allows women to share their experiences throughout their pregnancy without the need for travel and time. Braun et al. (2020) also suggests that qualitative data collected online is useful at giving voice to groups of people who may not be able to participate as readily in face-to-face research. Finally, online data collection tools for qualitative research can facilitate more honest and open responses from participants, given the added layer of anonymity that an online setting fosters (Braun et al., 2020).

Study 1 used QCA to investigate whether pregnant women self-report negative changes to their mood and memory during their pregnancy. The aim of this study was to explore how pregnant women and new mothers self-report changes to their mood and memory during pregnancy. This aimed to first delineate whether 'baby brain' symptoms (and related negative mood changes) feature in pregnant women's first-hand testimony of their own pregnancy experiences, to extend the literature outlined in Chapter 2 and centre women's experiences in discussions of 'baby brain' in the literature.

3.3.1 Study 1 Method

3.3.1.1 Participants and design

The data of 423 participants were initially collated from two wider studies ($N_{Study 1} = 220$; $N_{Study 2} = 203$). The wider studies from which this data is drawn are from Chapter 5 and Chapter 6 of this thesis. The data reported here are collected from questions that were included in both studies, which were shown to participants before other measures in the questionnaire. All participants were UK-based women who were either currently pregnant ($N = 261$, 61.70%) or 'new mothers', categorised as

women with a child less than two years old ($N = 162$, 38.3%) who reflected on their pregnancy. Participants were recruited from Prolific Academic and social media. Of the pregnant participants, 13.59% were in the first trimester, 38.53% were in the second trimester, and 48.54% were in the third trimester. The average age of participants was 29.41 ($SD = 5.78$), seven participants did not disclose their age. The majority of participants ($N = 258$, 60.99%) were White (40 were Asian, 25 were Black, and 100 were mixed ethnicity or 'Other'). 68.32% ($N = 289$) were educated to a degree-level or above. Ethical approval was granted by the University of Leeds School of Psychology Ethics Committee (References PSC-673, PSYC-83).

3.3.1.2. Procedure

After providing demographic information, participants were asked to report whether they noticed changes in their memory and mood throughout their (current or recent) pregnancy (yes/no). This wording was adapted for each group, to refer to either current or recent pregnancy. 423 participants responded to this quantitative item. If participants answered 'yes', they were given the option to textually elaborate on their answer via a free text box. This was accompanied by the prompt "*please provide an example or description if you can*". Of the 423 participants who responded to yes/no item, 118 participants then also provided follow-up textual responses to questions about their memory and 288 participants gave textual responses to questions about their mood changes. 120 of these participants provided answers to both memory and mood items. Both the quantitative data ($N = 423$) and the qualitative data to both questions is analysed and reported here.

3.3.1.2.1. Analytical approach

A directed QCA was used to analyse the textual data (Hsieh & Shannon, 2005), informed by Assarroudi et al. (2018). This type of analysis was chosen, because it is useful for larger qualitative datasets and allows for richer, more interpretative insights compared with other approaches, such as quantitative content analysis (Hsieh & Shannon, 2005). This qualitative content analysis was both deductive, i.e., applying pre-determined codes to the data (Elo & Kyngäs, 2008), and inductive, i.e., being led by the data to establish and generate new codes (Assarroudi et al., 2018), which makes it aligned with *directed* QCA. Under directed QCA, new codes and typologies may also arise as researchers spot content that is not covered by existing typologies, while also remaining informed by previous literature (Assarroudi et al., 2018). The 'baby brain' literature served as the conceptual framework for this analysis (Davies et al., 2018). To establish a set of deductive codes from the framework of interest, first, any studies containing self-report accounts of memory changes in pregnancy were reviewed. These were primarily sourced from meta-analyses and reviews (e.g., Davies et al., 2018; Henry & Rendell, 2007). Then, the core self-reported typologies of memory changes were noted and used as deductive codes in the data (see Table 3.1). The qualitative dataset in its entirety was then openly coded for pertaining to these codes of memory functions (as per Lombard et al., 2004). Beyond the deductive codes established from the literature, open coding was also done in a way that was attentive to new, inductive codes. This approach of using a hybrid process of inductive and deductive coding has been thought to strengthen the robustness of qualitative analysis (Fereday & Muir-Cochrane, 2006).

All textual responses were read multiple times before codes referring to each of the memory and mood domains in pregnancy were assigned to the data. Codes were not mutually exclusive; that is, in some instances, multiple codes were assigned to one textual response. While there is much debate about whether codes in qualitative content analysis should be mutually exclusive (e.g., Lindgren et al.'s (2020, p. 4) recommendation that codes may often be "intertwined" was followed. Coding was completed using the software Dedoose (www.dedoose.com) which is a coding software that allows users to organise codes and assign typologies to a dataset (Salmona et al., 2019). After assigning these codes, typologies were derived from the coding; these typologies refer to distinct typologies of experiences of pregnancy-related memory and mood functioning that were present in the data. Codes collapsed into typologies shared a broader meaning. Consistent with conventions of qualitative content analysis, illustrative quotes to exemplify category meanings were also noted. In order to stay true to participants' original meaning, quotes reported here are not paraphrased and are reported verbatim, including all typographical errors and slang. Quantitative analysis was conducted using JASP (www.jasp-stats.org).

3.3.1.2.2. Reflexivity

As with all qualitative research, reflexivity is an important aspect of the qualitative content analysis process (Darawsheh, 2014). Reflexivity is the process of actively reflecting upon how researcher positionality (i.e., researcher's own lived experience and viewpoint) impacts the research process (Lazard & McAvoy, 2020), which serves to confront and acknowledge bias. Therefore, it is important to note that the qualitative analysis reported here was completed predominantly by a woman who does

not have formal caring responsibilities or lived experience of pregnancy. This affects the lens through which the data are observed and analysed, because data are coded in a way that is not aligned with the researchers' own lived experience.

Table 3.1. Examples of deductive codes applied to the data from existing framework of the literature which investigates mood and memory changes in pregnancy. These deductive codes guided the first stage of QCA.

Focus of the study	Authors	Methodology	Relevant deductive codes
Memory changes in pregnancy	Parsons and Redman (1991)	Semi-structured questionnaire	Difficulty in concentration Absentmindedness Short-term memory
	Crawley (2002)	Open-ended questionnaire	Memory impairments Concentration deficits Poorer attention
	Sharp et al., (1993)	Questionnaire with free text box	Difficulty following conversations Inability to remember daily tasks Absentmindedness
	Orchard et al., (2021)	Self-report subjective memory measure	Memory errors Self-cued memory Environment-cued memory
Mood changes in pregnancy	Ross et al., (2004)	Self-report survey	Anxiety Depression Psychosocial stress
	Li et al. (2020)	Systematic review	Mood instability Depression Mood lability
	Clark et al., (2009)	Semi-structured interviews	Mood lability Body dissatisfaction

Staneva et al., (2015)	Meta-synthesis of qualitative studies	Psychological distress Anxiety, depression Pregnancy-related stress
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3.3.1.2.3. Coding process

The qualitative dataset in its entirety was open coded, using the deductive codes from Table 1 as a guiding starting point. That is, the data were first coded with these codes from the existing literature in mind, and then the data were read again looking for more inductive codes that were not captured in the first read of the data (Elo & Kyngäs, 2008). Beyond the deductive codes established from the literature, open coding was also done for more inductive codes (Elo & Kyngäs, 2008). Codes were not mutually exclusive; that is, in some instances, multiple codes were assigned to one textual response (Lindgren et al., 2020). Coding was done using the software Dedoose (www.dedoose.com). After assigning these codes, typologies were derived from the coding, which refer to distinct typologies of experiences of pregnancy-related memory and mood functioning that were present in the data. Codes collapsed into typologies shared a broader meaning. In order to stay true to participants' original meaning, quotes reported here are not paraphrased and are reported verbatim, including all typographical errors and slang.

For the memory change items, a set of 14 final codes were applied to the data. Multiple codes were often ascribed to each unit of analysis (i.e., each participants' response), resulting in a total of 197 overall assigned codes. These then were categorised into two sub-typologies and two final typologies of memory changes in pregnancy. For the mood changes responses, again, the literature surrounding mood changes in pregnancy

was first reviewed to establish deductive relevant codes. Example codes, sub-typologies and final typologies for the mood change responses can be seen in Table 3.2. There were 19 codes in the final analysis and 287 codes assigned to the data, due to overlap in coding of each unit of analysis. These then were categorised into three sub-typologies and two final typologies of mood changes in pregnancy.

3.3.1.2.4. Second coding process

To ensure the robustness of the directed QCA and to improve reliability of the generated codes, a second coder then second coded 20% of the dataset (58 responses to the mood items, 50 responses to memory items). The data were provided to the second coder 'blind', i.e., with no codes assigned, and the coding framework was also provided. This process was included to allow for discussion over coding structure, co-occurrence of codes, and analytical approach, rather than to establish a numerical interrater reliability (that has been used in other approaches). Following initial coding of 20% of the responses, agreement was reached and any disagreements in code assigning, or any perceived missing codes were resolved. Finally, all codes and final typologies were discussed with and checked by the whole research team, and any issues or collectively resolved.

3.4. Study 1 Results

In order to investigate self-reports of pregnancy-related change in memory, the frequencies of self-reported memory and mood changes in pregnancy were first assessed. A Chi-squared test showed that, of the 423 participants who responded to the yes/no question regarding memory and

mood changes, pregnant women were more likely to self-report changes in their memory in pregnancy (151/261; 57.85%) compared with the retrospective accounts of new mothers (58/162; 35.80%) $\chi^2 (1, N = 423) = 19.446, p < 0.001$. Pregnant women also self-reported more mood changes (82/261, 31.42%) than new mothers retrospectively did (27/162, 16.67%) $\chi^2 (1, N = 423) = 11.151, p < 0.001$.

3.4.1. Typologies of memory changes

The final typologies of self-reported memory changes were: (1) short-term memory lapses (2) chronic memory fog, which each represented a distinct profile of pregnancy-related changes. Typologies and example codes are represented in Table 3.2. Interestingly, participants in the dataset reported positive changes to their memory during and throughout pregnancy. Therefore, all typologies here refer to poorer memory changes during and following pregnancy. Forty eight participants wrote short responses that referred very generally to overall forgetfulness (e.g., “I was forgetful” and these were not included in the final typologies, as they did not refer specifically to a type of memory change in pregnancy. Each typology will not be discussed in-depth, with illustrative participant quotes. Here, in parenthesis, N refers to number of responses which included this code, and percentages indicate proportion out of the 118 participants who responded to this item who represent each code.

Table 3.2. Example codes, sub-typologies, and final typologies of memory responses.

Example codes	Sub-typologies	Final typologies
Lapses in memory	Sudden memory slips	Short-term memory lapses
Forgetting names		
Task-specific memory loss	Disorientation in everyday life	
Language-related memory loss		
Short-term memory loss		
(Dis)organisation of memory	Chronic memory impairment	Chronic memory fog
Feeling scatty		
Tiredness and confusion	Memory fatigue	
Absent mindedness		
Difficulty in concentration		

3.4.1.1. Typology one: Short-term memory lapses

The first typology of memory changes was '*short-term memory lapses.*' In this typology, most participants' responses were coded as reporting intermittent lapses of memory that affected them throughout defined tasks during the day (i.e., 'task-related lapses', $N = 71$, 60.17%) In this typology, participants' memory loss was immediate and noticeable, i.e., participants forgot what they were doing during a certain task or mid-conversation. For example, one participant described this type of memory

change as being categorised by “waking into a room and forgetting why”, which was echoed throughout the dataset. Similarly, other participants whose responses were coded in this typology recalled instances in their daily life where memory lapses occurred suddenly, which were at times disorientating and frustrating. One participant recalled: “when asking somebody if they wanted a tea or coffee. I would then walk into the kitchen and completely forget their answer.” Other examples include: “I left my car keys in the ignition” and “I forgot how to cook recipes I'd normally not have problems with (forgot ingredients etc)” and “forgetting my PIN number”.

Other participants also described times in their pregnancy where their memory would suddenly lapse during the day, sometimes when they were mid-way through a task or activity. These was often coded as being in the context of a conversation ($N = 29, 24.58\%$) or domestic task such as shopping and cooking. For example, one participant recalled that in their pregnancy they would “forget what I'm doing mid-way through or go in the wrong cupboard” and “I'd forget what was on a short shopping list”. Similarly, participants in this typology frequently referred to lapses in memory related to locating objects, remembering the time, and completing defined tasks ($N = 66, 55.93\%$). For example: “I would move things and remember at the time but 5 minutes later I would have to relook for it.”

Some participants reported anecdotes of ‘discovering’ artefacts of their memory lapses, such as items in the wrong place: “I put things down in odd places where they don't belong. Like today I found I put the syrup in the laundry room not in the cupboard.” Furthermore, a subset of responses ($N = 5, 4.24\%$) in this typology were coded as pertaining specifically to memory

lapses in the context of the workplace. For example, one participant described: “forgetting simple tasks for work like emailing people” and another explained that they “remember details about the projects im working on but find it hard sometimes to remember which specific project the details relate to.”.

Relatedly, responses in this typology also included codes such as forgetting names ($N = 2$, 1.69%), and language-related memory loss ($N = 31$, 26.27%). In this code, participants frequently reported ‘searching for the right word’, “stumbling on words” or, as one participant noted, knowing “what I wanted to say but couldn't remember the words”. Similarly, another participant recalled that in their pregnancy they: “Did a lot of word seeking...wrote a lot of things down/ set reminders on my phone.” Similarly, some participants also reported more chronic memory loss in the form of struggling to remember activities and information throughout the day. For example, one participant recalled that they often “can’t remember if I’ve eaten that day or if I’ve been to the toilet”. For example:

“I have no recollection of saying and doing some small things...My brain seems to substitute phrases...without me realising so occasionally I end up saying totally bizarre or stupid things.”

Overall, in this first typology participants described sudden lapses in their memory, which converged to form ‘baby brain’. This typology of memory change is not well represented in the quantitative literature; for example, studies have found symptoms such as ‘difficulty in concentration’ and ‘lower clarity of thought’ but do not typically describe the nuanced self-reported experience of this in women’s daily lives. Instead, the emphasis of

the literature is on objective changes in recall, rather than the context of this recall. For example, Sharp et al. (1993) describe pregnant women's performance on a range of objective tests and also note then, when asked to freely recall subjective experiences, women in the sample mention specific contextual examples such as an inability to remember daily tasks and friends' names. Similarly, the notion of language interference in pregnancy echoes other self-report findings from previous literature (Sharp et al., 1993), however, some studies have found no significant differences in verbal fluency of pregnant women versus other groups in objective measures (Logan et al., 2014). Therefore, this qualitative data provides richer nuance to these studies, identifying more specific contexts that women notice sudden lapses in memory functioning that may not be captured in laboratory tests of memory.

3.4.1.2. Typology two: Chronic memory fog

The second typology encapsulates two sub-typologies of women's experiences of memory changes: '*chronic memory impairment*' and '*memory fatigue*'. Beyond task-oriented memory lapses, the second typology observed in this dataset was defined as 'chronic memory fog', which was categorised by women who described an overall sense of confusion and fogginess (often referred to by participants as 'brain fog') throughout their pregnancy. This typology refers to memory deficits that were less defined and task-oriented than typology one, and instead was categorised by a general sense of fogginess, confusion, and disorientation, or "feeling my head is empty", as one participant recalled. This typology encapsulates responses with codes such as "poorer concentration" ($N = 4, 3.39\%$) and "loss of focus" ($N = 4, 3.39\%$). Some responses in this typology specifically

mentioned “brain fog” or “feeling scatty” in their written responses ($N = 7$, 5.93%). For example, one participant recalled: “I remember being fuzzy headed...Having to make more lists so I didn't forget things and if something wasn't in the diary, it certainly would be forgotten about!” Some participants explicitly labelled this memory ‘fog’ as baby brain’; for example, one participant reported that: “I definitely experienced "baby brain" - forgetfulness and the inability to recall certain names/memories etc. I would describe it like having a fogginess” and another participant describing their brain fog, and ended by noting that “Baby brain is a real thing!”.

Similarly, another participant recalled feeling “fuzzy headed” or “scatter-brained”, and another described “Forgetfulness and it takes a while to process information”. For example, one participant recalled that in their pregnancy they “suffered brain fog on a regular basis”. Some participants in this typology ($N = 4$, 2.29%) also referred to the inability to *organise* their thoughts and behaviour during pregnancy when asked to reflect upon memory changes in pregnancy. For example, when asked if they had experienced memory changes in their pregnancy, one participant reported feeling “less organized than usual.” Similarly, another participant noted that they “generally noticed a decreased ability to follow complicated thoughts”. Some participants in this typology also spoke specifically about tiredness and lack of sleep as a driver of feeling foggy in pregnancy; for instance, “I was VERY tired, and found myself forgetting things which would normally be very simple to me/ finding simple tasks difficult”. Overall, this typology represents the chronic sense of memory ‘fog’ that participants experience in pregnancy, which relates to factors such as organisation, tiredness, and information processing (as per Davies et al., 2018).

3.4.2. Typologies of mood changes

The final typologies for mood changes were: (1) mood instability and constant change (2) chronic low mood and parenting anxiety. Typologies and example codes are represented in Table 3.3. Fourteen participants in the dataset (4.88%) reported positive changes to their mood during and throughout pregnancy. Again, percentages in parentheses refer to the proportion of overall codes that each code comprises. For mood items, there were 288 overall assigned codes; therefore, percentages here are proportion out of 288.

Table 3.3. Example codes, sub-typologies, and final typologies of mood responses.

Example codes	Sub-typologies	Final typologies
Stress	Mental health concerns	Mood instability and constant change
Mood swings	Frustration	
Irritability		
Angry outbursts		
Positive mood change		
Pregnancy-related worry	Low mood	Low mood and parenting anxiety
Fatigue and weepiness		
Nervousness		
Pregnancy symptoms		

3.4.2.1. Typology one: Mood instability and constant change

The first typology of the mood changes item was categorised by accounts of mood swings, shifting mood, and instability of emotions throughout pregnancy. This included codes such as experiencing stress ($N = 6$, 2.08%), feelings of irritability ($N = 40$, 13.94%), mood swings ($N = 66$, 22.92%) and angry outbursts ($N = 54$, 18.75%). In this typology, participants frequently reported having lower tolerance and patience throughout their pregnancy, being “snappier than usual”, feeling “extremely agitated by non-issues” and being “short tempered”. Also present in this typology were accounts of irritability, lower tolerance and frustration (or being “ratty”, $N = 4$, 1.39%). For example, one participant noted that they “have noticed that I have less patience for normal everyday tasks”, and another described that throughout their pregnancy they were: “More irritable at times, when something happens that I wish was different or more straightforward when dealing with customer service for example”. Often, participants’ responses were coded as describing “intense tiredness” and “fatigue” specifically, in the context of mood swings ($N = 24$, 8.33%). For example, one participant explained that in their pregnancy they were “more sleepy and had mixed feelings” and another participant described that they experienced “tiredness which makes me have mood swings”. These self-reports also reflect the quantitative literature which demonstrates how pregnancy is associated with heightened levels of irritability (Bowen et al., 2012)

This anger, agitation, or mood change was often described as being “unnecessary”, “uncalled for” or occurring “without being triggered at all”. For example, one participant shared that in their pregnancy they had: “A lot shorter fuse, I flip at the smallest of things.” Similarly, another participant

noted that they experienced similar 'mood swings', which was categorised by quick changes between high and low mood: "I would fluctuate through extreme highs and lows." This echoes the cognitive literature which shows how pregnancy is a time of heightened mood instability (Bulgakov et al., 2018).

Finally, within this typology a subset of participants in the dataset ($N = 14$, 4.86%) reported *positive* changes to their mood during and throughout pregnancy within their responses. For example, some participants reported feeling "happier and more positive" and "on top of the world" throughout their pregnancy. Therefore, mood changes in pregnancy can also be categorised by positive changes, as well as the more negative examples.

3.4.2.2. Typology two: Chronic low mood and parenting anxiety.

Beyond the irritability and mood swings present in typology one, in typology two participants frequently reported more chronic, unwavering anxiety ($N = 27$, 9.38%), nervousness ($N = 10$, 3.47%) and, in some cases, depression ($N = 9$, 3.14%) throughout their pregnancy. The most common code in this typology was feelings of heightened or excessive experience of emotions ($N = 85$, 29.51%). For example, one participant reported that they were: "Much more emotional (would cry at things which I previously didn't)". Some participants in this typology also explicitly wrote about their *parenting*-related anxiety ($N = 9$, 3.13%). This covered aspects such as experiencing anxiety about parenting a first child, and nervous anticipation of life with a new-born; for example, one participant recalled that they were frequently "Stressing about the safety and future of my child" and another participant wrote that: "majority of the time I was anxious...anticipating how difficult it

would be.” This reflects the survey literature which demonstrates how pregnant women experience prenatal anxiety (Dunkel Schetter & Tanner, 2012), in response to increased emotional vulnerability in pregnancy, which can persist into parenting (Huizink et al., 2017).

Participants in this typology were often coded as responses that contained references to “crying”, “weeping”, or “being teary” throughout their pregnancy. For example: “I was more weepy than usual. I would cry just looking at baby pictures.” Parenting-related anxiety was also linked to tiredness, fatigue, annoyance, and an increased dependence on partners and peers. For example, one participant described that their intense tiredness and parenting-related meant that they were more frequently “depending on my family to do my routine job.. bcoz i was tired”. Another participant commented that they has: “fear that i might not be a good enough mother”. This typology aligns with both the ‘good enough mothering’ mandate that women must adhere to in their pregnancy and into motherhood (e.g., see Pedersen, 2016).

As well as feeling teary and experiencing stress related to parenting anxiety, participants in this typology also talked more broadly about feeling “not myself at all” and “just a bit off”, which was often prompted by pregnancy-related changes such as cravings ($N = 2$, 0.69%) and morning sickness ($N = 3$, 1.04%); for example, one participant commented that they felt “low early on in pregnancy due to severe morning sickness.” Relatedly, some participants in this typology ($N = 3$, 1.04%) reported that their low mood was prompted by body dissatisfaction. For example, one participant reported that “everything felt like a herculean task for me given my small

body frame and a growing belly.” This typology also highlights how concerns about one’s body, mood, and relationships are interlinked in pregnancy (Clark et al., 2009).

3.5. Study 1 Discussion

Overall, this chapter aimed to provide an account of women’s memory and mood experiences during pregnancy, in order to accompany and expand the quantitative literature in this area. This chapter confirms that women do generally self-report differences in their memory functioning during pregnancy, which is of particular interest to the aims of this thesis more broadly. This study employed a relatively large, albeit culturally homogenous, sample of pregnant women and new mothers, and investigated how women self-report changes to their memory and mood. The qualitative content analysis generated two dominant typologies self-reported memory changes in pregnancy (*‘short-term memory lapses’* and *‘chronic memory fog’*) and two typologies of self-reported mood changes (*‘mood instability’* and *‘low mood and parenting anxiety’*). These typologies largely reflect the quantitative literature which uses survey instrument methodologies to investigate pregnancy changes.

This analysis thus confirms that findings from quantitative enquiries into mood and memory changes in pregnancy are largely reflective of women’s self-reported experiences. This study has also found typologies of changes that may not be captured by laboratory tests of memory or mood functionality (e.g., the *‘sudden lapses’* in memory that women reported). There are limitations to this study. In particular, women in this sample may have pre-existing or post-natal mental health conditions, which were not

accounted for. Therefore, the extent to which this sample is representative of a wider perinatal population is not clear. This study also represents a survey with relatively short data; therefore, future work should incorporate richer qualitative data collection methodologies to explore this further. This work may also investigate the impact that memory and mood changes have on maternity service provision. Similarly, future work could also investigate whether the self-reported changes that women experience correlates with actual performance on quantitative tasks.

It is important to note that although this study is qualitative, the textual data reported here was relatively short and did not lend itself to more interpretive approaches to qualitative analysis (such as narrative or discursive analyses). Therefore, while this study is able to speak to women's self-reported experiences, it may not constitute '*lived experience*' research, which is often more interpretive, interrogative, and rich. Furthermore, Study 1 aimed to generally ascertain whether women self-report changes to the memory and mood throughout pregnancy, in order to provide some evidence that 'baby brain' is a feature of women's experiences. What this research does not do, however, is explore how women navigate the 'baby brain' discourse specifically. Therefore, while this research is a useful starting point, and offers much in the specific context of this thesis, future work should adopt qualitative methodologies to explore how women resist, embrace, or navigate the concept of 'baby brain' in their pregnancy.

3.5.1. Link to Chapter 4

Study 1 broadly confirms that findings from quantitative enquiries into mood and memory changes in pregnancy are largely reflective of women's

lived experiences. This is important for the broader research questions of this thesis, because it confirms that negative memory changes (i.e., 'baby brain') do feature in women's own testimony of their pregnancy. This study has also found typologies of changes that may not be captured by laboratory tests of memory or mood functionality (e.g., the 'sudden lapses' in memory that women reported). To explore this further, future research should now investigate whether these typologies of mood and memory changes look different in different groups of pregnant women. Similarly, future work could also investigate whether the self-reported changes that women experience correlates with actual performance on quantitative tasks. In light of the above evidence that pregnant women self-report memory deficits during their pregnancy, this thesis will now turn to an investigation of whether this perception is widely held among other people (i.e., whether pregnant women are perceived to be less competent than other groups or whether this is self-perception alone; Chapter 4), before exploring possible social explanations that may contribute to 'baby brain' performance (Chapters 5 and 6).

Chapter 4: Investigating the content of pregnancy stereotypes

4.1. Chapter overview

In Chapter 3, the self-reported mood and memory changes of pregnant women and new mothers were investigated and qualitatively analysed. This found that pregnant women self-report both short-term and chronic changes to their mood and memory throughout pregnancy. This provides initial evidence for the existence of self-reported 'baby brain' symptoms in pregnancy. Now, before empirical work can delineate how social cognitive explanations account for pregnancy women's memory performance, it is first useful to understand the *contents* of pregnancy-related stereotypes. This chapter will thus investigate how people stereotype pregnant women and whether 'baby brain' features in these perceptions. In Study 2, participants ($N = 590$) rated a target group (pregnant women) and thirteen other comparison groups on perceived ability to perform tasks aligned with warmth (compassion, empathy, and comfort) and competence (mathematics ability, logic, memory), informed by Fiske et al.'s (2002) Stereotype Content Model (SCM). This found that pregnant women were generally stereotyped to have high warmth and low competence, the latter of which is consistent with the 'baby brain' stereotype. Participants also reported that pregnant women have moderately worse cognitive abilities compared with non-pregnant women. Study 3 ($N = 54$) then descriptively investigated the contents of stereotypes related to pregnant women, new mothers, men, and women using a trait generation task. Generated traits were coded within the warmth/competence domains of the SCM. This showed that pregnant women, new mothers, and women were associated

with traits aligned with positive warmth and negative competence, with the inverse true for men. The empirical work in this chapter thus confirmed that perceptions of low competence and 'baby brain' in pregnancy is broadly held by a non-pregnant sample.

4.2. Introduction

Despite the considerable 'baby brain' literature (Davies et al., 2018) and the evidence that pregnant women experience benevolent sexism, discrimination, and stigma (e.g., Sutton et al., 2011), it is unclear whether the perception of pregnant women as cognitively inferior is widely held by a general population. It is also unclear whether this perception is unique to pregnancy, or whether the 'baby brain' perception constitutes a more generic form of gender stereotyping that also applies to other parental groups, such as fathers or mothers with young children. Therefore, the work in the present chapter investigated the *contents* of social stereotypes about pregnant women in comparison with other groups. It was theorised that the stereotypes that pregnant women face may be an *amplified* or heightened version of existing gender stereotypes. This hypothesis is corroborated by the literature which demonstrates how gender stereotypes are particularly salient in parenthood.

This work is situated in the research which demonstrated that throughout the transition to parenthood, gender inequalities become increasingly pronounced (Bays, 2017; Craig & Mullan, 2010). For example, parenthood accounts for higher discrepancies in men and women's earnings across countries (Cooke, 2014), unequally gendered division of labour (Brines, 1994; Craig, 2007; Greenstein, 2000), and this creates differences in men and women's attainment (Baker, 2010; Budig & England, 2001). Due

to this, researchers have suggested that parenthood is a *critical site* of gendered inequalities (Lyness & Judiesch, 2014), which is reinforced by subscription to traditional gendered norms and ideologies (e.g., Coltrane, 2000; Major, 1993). Therefore, the gender norms that parents face may represent an *amplified* version of existing gender norms, expectations, and stereotypes (Fox, 2001). As Craig and Mullan (2010, p. 1435) summarise, “it is only on becoming parents that gendered expectations hit home”.

4.2.1. Stereotype Content Model (SCM)

As Riggs (1997) notes, in parenthood, unlike other distinctly gendered arenas, men and women are broadly categorised as fulfilling either the duty of ‘breadwinner’ or ‘care-giver’. In her seminal analysis of how distribution of social roles informs perceptions of mothers and fathers, Riggs highlighted that the social roles of ‘breadwinner’ or ‘care giver’ are influenced by perceptions of a person’s traits of *communality* and *agency*. Since this early work, much subsequent research has investigated how these constructs guide our development of gendered norms (e.g., Brosi et al., 2016). Riggs’ (1997) conceptualisation of parental stereotypes compliments Fiske et al.’s (2002) ‘Stereotype Content Model’ (SCM), which broadly describes the contents of stereotypes of different social groups. The model posits the traits of ‘warmth’ (i.e., kindness, compassion, pro-sociality) and ‘competence’ (i.e., intelligence, skills, agency) exist in a *fourfold taxonomy*, whereby subgroups of people are socially categorised as either high or low in each (see Fraser et al., 2021). Competence is generally associated with high status groups (Cuddy et al., 2009; Dovidio et al., 2000) and warmth with lower status groups. The dimension of warmth has been labelled in other work as communion (Abele & Wojciszke, 2007, 2014), ‘social goodness’ (Rosenberg

et al., 1968), or social skills (e.g., Lai & Babcock, 2013); likewise, competence has been referred to as 'agency' (Abele & Wojciszke, 2007) or intelligence (Rosenberg et al., 1968).

Importantly, perceptions of warmth and competence are not mutually exclusive (Fiske et al., 2002). Thus, there are four broad reactions to these of this stereotype content, depending on whether an individual is rated as high or low on either dimension, these are defined by Fiske and colleagues as: *admiration* (pertaining to those rated high in warmth and high in competence; Fiske, 2012), *contemptuous* (low on both dimensions), *envious* (high competence, low warmth), and *paternalistic* (low competence and high warmth). Groups of mixed-valence, i.e., those who are high in one dimension and low in another, are often met with ambivalence (Cuddy et al., 2004) or, in the context of gender stereotypes, ambivalent sexism (e.g., whereby women are either treated hostilely or benevolently; Glick & Fiske, 2001; Glick et al., 2000). Therefore, the content of the stereotypes informs the nature of the social perception (Cuddy et al., 2007, 2008).

A considerable amount of research has suggested that women are perceived generally to be communal and warm, and men are stereotyped to be more competent, agentic and assertive (Belk & Snell, 1986; Deaux & LaFrance, 1998; Eagly et al., 2000; Eagly & Steffen, 1984; Eagly & Wood, 1985; Spence et al., 1975). This distinction has demonstrated robustness over time (e.g., Cuddy et al., 2009; Feingold, 1994). These stereotypes inform distribution of genders in different domains and, therefore, govern expectations and behaviour that is gendered (Moss-Racusin et al., 2012). Because of this, Becker and Asbrock (2012) note that ratings within the

SCM can influence likelihood to offer support to different groups (Swencionis & Fiske, 2016).

Importantly, these stereotypes about different groups are not only descriptive and categorical, but they are *prescriptive*, in that they dictate what groups should look like and do (Cialdini & Trost, 1998; Eagly & Steffen, 1984; Fiske & Stevens, 1993; Ramos et al., 2018). For example, the overriding stereotype of women as warm but incapable thus determines that women should behave in a way that is passive and subservient (Williams & Best, 1990). These stereotypes have harmful consequences for women, including restricting access to traditionally masculine fields (e.g., STEM careers; Good et al., 2012), reducing women's leadership aspirations (Johnson et al., 2008) and harming performance evaluations (Bauer & Baltes, 2002). The amplification of gender stereotypes in parenthood is likely due to the notion that motherhood, as a social category, embodies stereotypically feminine traits (Cuddy et al., 2004; Heilman & Okimoto, 2008) and thus motherhood is socially constructed as a "critical aspect of femininity" (Choi et al., 2005, p. 168).

The *content* of stereotypes and the social norms that govern roles in society perpetuate one another; that is, observations of social roles determine the contents of corresponding stereotypes (Eagly & Wood, 2012; Koenig & Eagly, 2014; Sczesny et al., 2018). This has been explored in some depth in the context of parenthood, overwhelmingly in the form of perceptions of mothers and fathers in the workplace (e.g., Etaugh & Folger, 1998). For example, Fuegen et al. (2004) found that parents were judged by a participant sample of 196 undergraduates to be less agentic than non-

parents; moreover, mothers were appraised more harshly compared with fathers. This echoes Burgess' (2013) notion of a 'motherhood penalty', in that social expectations of mothers are perceived to be at odds of that of 'ideal worker', which leads to harsher judgements and perceptions of lower organisational competence and commitment. Research demonstrates that mothers are perceived to be less competent in the context of employment decisions (Correll et al., 2007; Heilman & Okimoto, 2008), which reflects wider gender stereotypes and is related to the fundamental negative perceptions of 'caregiver' as a devalued role (Ridgeway & Correll, 2004).

4.2.2. Pregnancy stereotypes

Although there is strong evidence which points to the existence of a broadly gendered framework of competence and warmth, gender scholars have also noted that different parental subgroups within the broad gendered categories may be stereotyped differently (e.g., Cuddy et al., 2004). For example, Ganong and Coleman (1995) provide evidence to suggest that different "types" of mothers are stereotyping differently in different contexts. In recent years, this model has been explored in relation to warmth-competence dimensions concerning professional mothers (Cuddy et al., 2004), pregnant employees (Masser et al., 2007), and mothers of different socioeconomic status (Dodson & Schmalzbauer, 2005). Further work has extended these enquiries; for example, Cuddy et al. (2004) note that working mothers have "dual category membership" in relation to the SCM. Working mothers may fulfil the stereotype of '*female professional*' (stereotypically competent, yet cold) or '*homemaker*' (stereotypically incompetent, yet warm).

In this sense, it may be argued that gender-stereotypes that emerge throughout parenthood exemplify and heighten the stable gender-based stereotypes that men and women already are susceptible to throughout their lives. However, given that gendered parental stereotypes are '*dynamic*' (Banchefsky & Park, 2016), in that they respond to shifts in social roles (Eagly, 1983), it is important to provide a contemporary account of gender stereotypes in this context. Here, it was theorised that gender stereotypes persist into parenthood, going above and beyond any gender-based pressures and prejudice that may have otherwise previously existed. Therefore, it is helpful to conceptualise the specific gender-based stereotypes faced by parents through a lens of gender role incongruence theories, and the SCM.

For example, Eagly's notion of role congruity theory dictates that female leaders face prejudice from other people due to perceived incongruity between being female and being a leader (Eagly & Diekmann, 2005). This theory is built on the premise of rigid and global social roles that correspond to genders (Cialdini & Trost, 1998; Eagly, 1987) and suggests that incongruences between gender and social norms, lead to prejudice due to preference for a person of the 'correctly corresponding' gender to perform the task, role or activity at hand. This is likely exasperated in motherhood, which carries with it its own set of rigidly governed norms and expectation, leading to the 'motherhood penalty' (Burgess, 2013). Although the prescriptive, and thus supposedly 'congruent' (Eagly & Diekmann, 2005) norms that motherhood identities occupy likely intersect with other demographic identities (e.g., see Schneider & Bos, 2019 for a discussion on political intersections of social role theory), they continue to inform and

mandate social behaviours in unwavering ways. Role congruity theory may also shed some light on why working mothers in particular face prejudice (Sabat et al., 2016). Indeed, the majority of research in this area has focused on how women and men experience unique gendered pressures as mothers and fathers, in the context of gender stereotypes. What has been notably absent from the literature, however, is how gender stereotypes *evolve* throughout the transition to parenthood and beyond.

4.3. Study 2

While ample research has investigated how stereotypic beliefs of parents are transmitted and enacted through interactions with their children (Endendijk et al., 2018), there is a notable lack of research that explores how different parenting groups are stereotyped themselves. This study serves to fill this gap, investigating how different nuances of parenting identities may fit within Fiske's SCM and Eagly's notion of gender role congruence in the transition to parenthood. Whilst recent work has demonstrated that the two dimensions of warmth and competence, proposed by the SCM, continue to shape our social cognition and stereotyping behaviours (Fiske, 2018), this concept has not yet been used a framework to interrogate parenting perceptions in a contemporary context. This study also tested whether pregnant women are stereotyped in different ways to other parental groups, in order to further explore how women are uniquely stereotyped throughout pregnancy. It was hypothesised that, in line with the SCM, pregnant women would generally be perceived as less competent and more warm than other groups (as per Ebert et al., 2014; Prentice & Carranza, 2002).

4.3.1. Study 2 Method

4.3.1.1. Participants and design

After removing 39 incomplete entries, the total sample comprised 590 participants ($M_{age} = 24.16$, $SD = 9.57$), recruited through survey share platforms (e.g., SurveyShare), social media websites, and the University of Leeds undergraduate participant pool from November 2018 – January 2019. The majority of participants were female (82.4%), White British (73.5%), non-parents (87.9%), educated to A-level standard or above (94.2%). Participants rated each of 14 groups (teenage boy, teenage girl, teenage pregnant girl, middle-aged man, middle-aged woman, new father, new mother, working father, working mother, mother with young child, father with young child, elderly man, elderly woman) on a number of measures designed to tap warmth or competence. The analyses treated this as a one within-subjects factor with 14 levels. Ethical approval was granted by the University of Leeds School of Psychology Research Ethics Committee. (Ref: PSC-457) on 16th November 2018. All materials for this study are in Appendix A.

4.3.1.2. Procedure

Questions were presented to participants online on the survey hosting site Qualtrics. After providing informed consent and demographic information, participants were asked “how would you rate the ability of a [Group Member] to...” complete seven ability domains, three of which were related generally to ‘competence’ (*remember information/solve a logic problem/complete a mathematics equation*), and three to ‘warmth’ (*comfort and support other people/empathise with others/respond compassionately to a person in distress*) with one filler item (*lift heavy objects*). This was scored

on a five-point Likert scale ranging from 1 (*extremely below average*) to 5 (*extremely above average*). This is adapted from Fiske et al.'s (2002) original methodology. Participants were prompted to "be as honest as possible and be reminded that there are no right or wrong answers".

Participants were asked to rate a target group (Pregnant Women) and thirteen other comparison groups (New Father, New Mother, Elderly Man, Elderly Woman, Teenage Boy, Teenage Girl, Working Mother, Working Father, Mother with a Young Child, Father with a Young Child, Middle-aged Woman, Middle-aged Man, Pregnant Teenager). Both the order of groups and the order of the listed domains were fully randomised, using the survey flow randomisation function in Qualtrics. The option 'evenly present elements' was selected to ensure randomisation.

Mean ratings of competence and warmth were calculated for each of the groups, by averaging the ratings for the competence domains (maths, logic, memory) and the warmth domains (compassion, empathy, comfort). Cronbach alpha confirmed that each scale had satisfactory internal consistency (Competence $\alpha = 0.921$, Warmth $\alpha = 0.928$). Previous research has utilised a cluster analysis approach, in which groups are clustered together based on their ratings within the stereotype taxonomy (Durante et al., 2010; Everitt et al., 2011; Fiske et al., 2002). In this work, because the structure of the SCM has been previously demonstrated to be robust and stable (Fiske, 2018), mean comparisons were used (as per Cuddy et al., 2004) to directly test the hypotheses about the stereotype content of the parental groups.

Finally, participants were then provided with a brief definition of the term 'cognitive abilities' ("*Cognitive abilities' refers to how well someone performs on brain-based tasks, which may include problem-solving, memory, attention, concentration, and language*") and were asked to indicate the extent to which they thought there was a difference between the cognitive abilities of women compared to men (*1 = there is no difference, 2 = there is a moderate difference, 3 = there is a big difference*). Participants were asked "How would you describe this difference?" and were provided with a 5-point Likert scale (*1 = women have much weaker cognitive abilities to 5 = women have much stronger cognitive abilities*). Participants then completed a final measure which rated their understanding of the pregnancy-related changes and experience of pregnancy.

4.3.2. Analysis plan

A multivariate analysis of variance (MANOVA) was first conducted, with one within-subjects factor of Group with 14 levels and one between-subjects factor of participant Gender with two levels (male vs female), with warmth and competence scores and dependent variables. When the multivariate effects were significant, univariate effects were investigated and post-hoc tests were performed with LSD corrections. Then, as per Williamson (2019), using the Group means for warmth and competence as midpoint anchors, each group was plotted within the SCM taxonomy (see Figure 4.2). Differences in warmth and competence ratings between groups assigned to the four quadrants of the SCM taxonomy were then investigated.

4.3.3. Study 2 Results

4.3.3.1. Warmth and competence ratings

To explore whether groups differ in warmth and competence, first a within-subjects MANOVA with 14 levels (group: teenage boy, teenage girl, teenage pregnant girl, middle-aged man, middle-aged woman, new father, new mother, pregnant woman, working father, working mother, mother with young child, father with young child, elderly man, elderly woman) was run, with two dependent variables: ratings of warmth and ratings of competence and one between-subjects factor, participant gender. The MANOVA showed an overall multivariate within-subjects effect of Group, $F(26, 446) = 34.670$, Wilks $\Lambda = 0.331$, $p < 0.001$, $\eta_p^2 = 0.669$. Further, there was also a small but significant between-subjects multivariate effect of participant Gender, $F(2,470) = 3.321$, Wilks $\Lambda = 0.986$, $p = 0.037$, $\eta_p^2 = 0.014$. However, there was no significant Gender*Group multivariate interaction, so this was not analysed further, $F(26, 446) = 1.469$, Wilks $\Lambda = 0.921$, $p = 0.066$, $\eta_p^2 = 0.079$.

The univariate tests for warmth and competence were then investigated. For ratings of warmth, there was a significant effect of Group, $F(9.207, 1830.71) = 136.19$, $p < 0.001$, $\eta_p^2 = 0.224$. Since sphericity was violated ($\epsilon = 0.118$), Greenhouse-Geisser corrected results are reported here. There was also a significant effect for competence ratings, $F(8.523, 4014.123) = 115.19$, $p < 0.001$, $\eta_p^2 = 0.196$. Then, to test the hypothesis that pregnant women would be rated as more warm and less competent than other groups, post-hoc pairwise comparisons with LSD corrections were investigated. Post-hoc pairwise comparisons indicated that pregnant women were rated as significantly warmer than most other groups ($p < 0.001$ in all cases) except middle aged women, new mother, mothers with young

children, working mothers, and elderly women, who were each rated as significantly more warm than pregnant women (see Table 4.1). There was no significant difference between pregnant women compared with new fathers and fathers with a young child on warmth ratings. For competence ratings, pregnant women were rated as significantly less competent than most groups except teenage pregnant girls and elderly people, who were each rated as significantly less competent than pregnant women. There were also no differences between the competence ratings of pregnant women and new mothers (Table 4.1). Descriptive statistics are also plotted in Figure 4.1.

Table 4.1. Descriptive statistics with differences compared with pregnant women marked in superscript.

	Warmth		Competence	
	M	SD	M	SD
Teenage boy	2.48 ^{*a}	0.60	3.12 ^{*b}	0.56
Teenage girl	3.38 ^{*a}	0.69	3.25 ^{*b}	0.56
Teenage pregnant girl	3.35 ^{*a}	0.70	2.74 ^{*a}	0.62
Middle aged man	2.93 ^{*a}	0.61	3.24 ^{*b}	0.52
Middle aged woman	3.74 ^{*b}	0.59	3.19 ^{*b}	0.50
Pregnant woman	3.52	0.50	2.95	0.51
New father	3.52	0.64	3.07 ^{*b}	0.56
New mother	3.92 ^{*b}	0.70	2.92	0.60
Working mother	3.83 ^{*b}	0.65	3.43 ^{*b}	0.54
Working father	3.17 ^{*a}	0.64	3.42 ^{*b}	0.55
Mother with young child	4.02 ^{*b}	0.66	3.13 ^{*b}	0.53
Father with young child	3.59	0.61	3.23 ^{*b}	0.51
Elderly man	3.19 ^{*a}	0.72	2.47 ^{*a}	0.70
Elderly woman	3.77 ^{*b}	0.66	2.38 ^{*a}	0.65

*a indicates significantly lower than pregnant women, $p < 0.001$

*b indicates significantly higher than pregnant women, $p < 0.001$

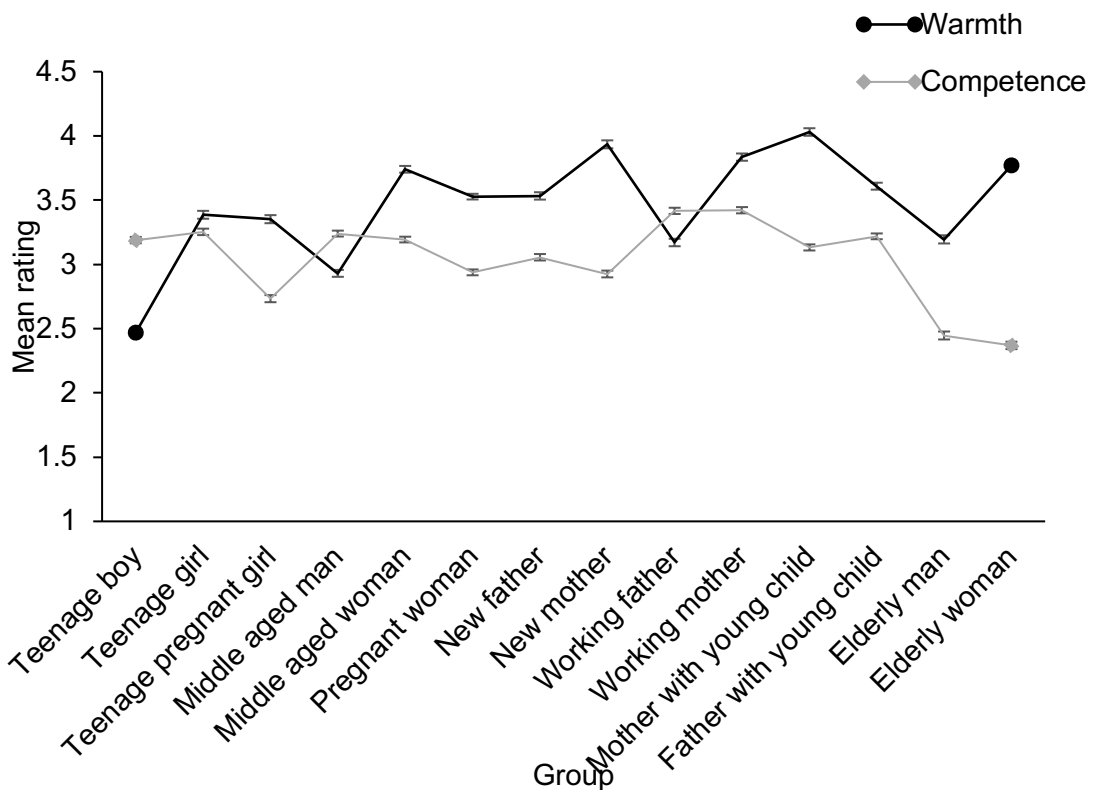


Figure 4.1. Plotted mean warmth and competence ratings for each group. Error bars represent standard error of the mean.

4.3.3.2 Stereotype Content Model taxonomy

Using the above means, each parental group was then classified along Fiske et al.'s quadrants of Stereotype Content, to ascertain how each group descriptively fit within this taxonomy of stereotyping. This was achieved by mapping the groups onto the SCM taxonomy (Figure 4.2), as per Williamson (2019). Middle aged men, teenage boys, and working fathers were rated as fulfilling the 'envious' response; that is, high competence, low warmth. Teenage girls were also perceived to fit within the 'envious' quadrant. Importantly, working mothers, fathers and mothers with young child and middle-aged women were perceived the most positively, in the 'high warmth, high competence' quadrant of the SCM, and thus eliciting the

'admiration' response. Only new mothers, pregnant women, and elderly women elicited the 'paternalistic' quadrant of the SCM, as they were perceived to be generally high in warmth but low in competence. Finally, elderly men and teenage pregnant women were perceived to fulfil the 'contemptuous' quadrant, they were perceived to be low in both warmth and competence.

After coding each group for their respective taxonomy, a one-way ANOVA was then run, with ratings of mean warmth and competence as the dependent variables and assigned quadrant as the independent variable, with four levels representing the four taxonomies. Overall, the ANOVA showed significant between-group differences for both overall mean warmth, $F(3,13) = 7.511$, $p = 0.004$, $\eta^2 = 0.03$ and competence $F(3,13) = 9.643$, $p = 0.001$, $\eta^2 = 0.048$.

Post-hoc tests with Bonferroni corrections were used to investigate how each quadrant of our plotted SCM differed from one another in perceived warmth and competence. Those coded as belonging to the 'admiration' quadrant were perceived to be significantly warmer than the 'envious' quadrant $p = 0.011$ [95% CIs, 0.17, 1.33,], but not the contemptuous ($p = 0.49$) or paternalistic quadrants ($p = 1.00$). The paternalistic quadrant was perceived to be significantly warmer than the envious quadrant $p = 0.025$ [95% CIs, 0.08, 1.41]. There were no other significant differences between the contemptuous group and any of the other quadrants (all $p > 0.05$). The admiration quadrant was also perceived to be significantly more competent than the paternalistic quadrant $p = 0.042$, [95%

CIs, 0.015, 0.905] and the contemptuous group $p = 0.018$ [95% CIs, 0.095, 1.115), but not the contemptuous group ($p = 1.00$).

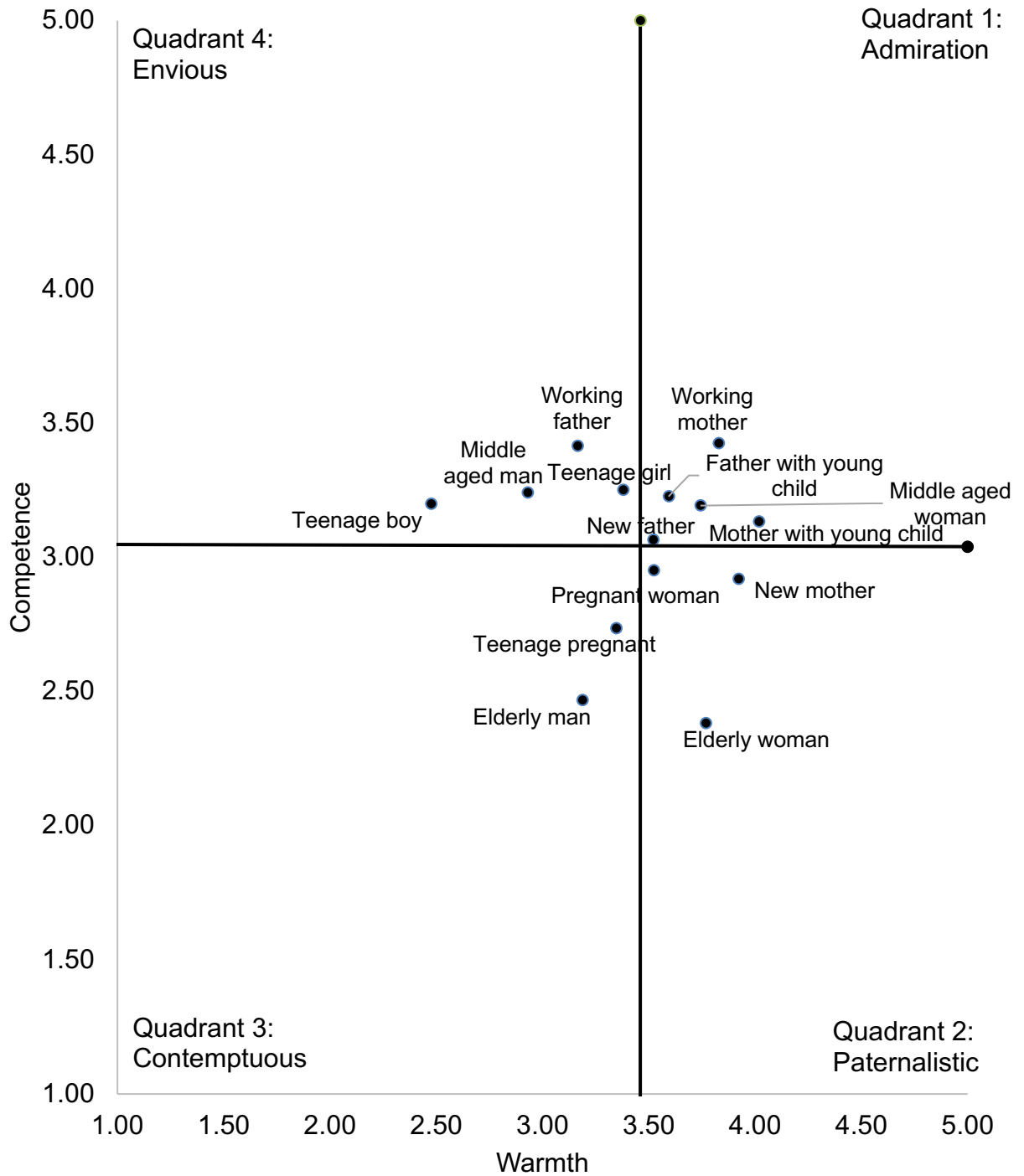


Figure 4.2. Groups warmth and competence ratings fit within the SCM taxonomy. Warmth and competence dividing lines are plotted on the median point.

4.3.3.3. Perception of cognitive abilities

Finally, the frequencies of agreement with “*there is a difference between the cognitive abilities of [men and women] and [pregnant women and non-pregnant women]*” was investigated. 65% of participants reported that there was ‘no difference’ between the cognitive abilities of men and women. 54.1% of people thought there was a ‘moderate’ difference between the cognitive abilities of pregnant women versus non-pregnant women, in the direction that ‘pregnant women have moderately weaker cognitive abilities’ (48.7%).

4.3.4. Study 2 Discussion

Study 2 aimed to assess how distinct parental groups fit into Fiske et al.’s proposed SCM, which suggests that people are generally appraised along a continuum of warmth and competence (see Fraser et al., 2021). Overall, this study confirmed that pregnant women are stereotyped to have low competence by a large, non-pregnant sample, as per the ‘baby brain’ stereotype. This suggests that ‘baby brain’ is a widely held perception of pregnant women, which thus confirms the appropriateness of stereotype threat theory as a paradigm to further test the impact of activating the ‘baby brain’ stereotype on pregnant women’s cognitive functioning. This will form the basis of the rest of the empirical work of this thesis (Chapter 5-6). Moreover, within the wider SCM ratings of this study, a number of other notable results emerged. Each quadrant will be now discussed, in relation to the wider literature concerning the SCM.

4.3.4.1. Paternalistic quadrant

Most notably, this study found evidence to support the notion of protective paternalism against pregnant women and new mothers, which echoes the notion of benevolent sexism in early motherhood and beyond (e.g., Glick & Fiske, 2001). That is, pregnant women and new mothers occupied the low competence, high warmth quadrant, eliciting the stereotype of paternalism. A similar effect occurred for elderly women, a group that is also subject to benevolent stereotype, due to the intersection of age and gender prejudice (Cuddy et al., 2005). The notion that these groups of women are stereotyped to be largely warm and incompetent, thus triggering a 'paternalistic' response (Eckes, 2002; Haddock & Zanna, 1994) is aligned with the 'women are wonderful' effect (Eagly & Mladinic, 1989). This explains the *protective paternalism* that women experience, particularly in times where these distinctions are most prominent, for example, during pregnancy (e.g., Sutton et al., 2011) and motherhood (e.g., Szastok et al., 2019). Interestingly, elderly men were not similarly stereotyped, and instead occupied the contemptuous stereotype quadrant. Previous research has demonstrated that elderly women are stereotyped more negatively than men (Canetto et al., 1995).

4.3.4.3. Envious quadrant

The envious quadrant, which is categorised with high competence and low warmth, included both 'middle-aged man' and 'working father'. This largely corroborates the vast literature which demonstrates how men are generally stereotyped within this quadrant (e.g., see Eagly et al., 2000; Eckes, 2002; MacDonald & Zanna, 1998). Eckes (2002) also demonstrates that this stereotyping held when accounting for different subgroups of men;

for example, 'businessman' is deemed an 'exemplar' of the envious quadrant (Fiske et al., 2002). Interestingly, 'teenage boy' and 'teenage girl' were also stereotyped to be high in competence but low in warmth, relative to other groups. While little research has concentrated specifically on this grouping within the SCM, previous literature has also investigated the impact that age-markers (i.e., "young" "children" etc) has on applicability to the SCM (Kervyn et al., 2013). This quadrant was thus generally aligned with the literature on envious stereotypes.

4.3.4.4. Contemptuous quadrant

The two groups in the contemptuous quadrant of the SCM plot were 'teenage pregnant women' and 'elderly men'. A contemptuous response has been related to negative perceptions of emotions and behaviours (Ufkes et al., 2012). Research demonstrates how teenage pregnant women are subject to negative stereotypes, contempt, and discrimination (e.g., Jones et al., 2019; Neill-Weston & Morgan, 2017; Phipps-Yonas, 1980). Also, research shows that elderly people are subject to ongoing ageism, which often involved prejudices including the perception that elderly people are unproductive and not capable (Orešković, 2020). Again, the groups of people ascribed to this quadrant were thus aligned with the broader literature.

4.3.4.5. Admiration quadrant

Parental groups were most readily associated with 'admiration' in the mapping of these results. Thus, the 'women are wonderful' effect was evidenced here, given that working mothers, mothers with young children, and middle-aged women occupied the 'admiration' quadrant in this data

(Eagly, 2018). This echoes the literature which suggests that women are considered 'superhuman' during early parenthood (Choi et al., 2005), which means that mothers are admired within the SCM (Bays, 2017)., in this study, men who are fathers were perceived more positively compared with childless 'middle aged man' group, which is a finding in line with previous research (Fiske et al., 1999; Sheeran et al., 2021). As Sheeran et al., (2021, p. 361) explain of previous SCM work in the context of parenthood, "Men who were fathers gained in warmth but also retained their perceived competence". This is likely due to how stereotypes about fathers are linked intrinsically to constructions of masculinity (e.g., hegemonic masculinity; Randles, 2018).

4.4. Study 3

In order to identify further stereotypes associated specifically with women throughout their pregnancy, Study 3 used a trait or adjective-generation task (Katz & Braly, 1933), to extend inquiries into stereotype contents of pregnant women. Trait-generation tasks have been used in previous literature to investigate constructs such as perspective taking and cognitive representation of people (Davis et al., 1996), self-schemas (Deutsch et al., 1988) and stereotyping (Hummert et al., 1994). Study 3 aimed to investigate the contents of pregnancy stereotypes, in order to inform future work in this thesis which investigates implications of stereotype activation (see Chapter 5).

4.4.1. Study 3 Method

4.4.1.1. Participants and design

Fifty-four participants were recruited through the University of Leeds participant pool. Participants ($M_{age} = 19.17$, $SD = 1.34$) were mainly White British (92.5%) and heterosexual (81.1%). No participants were removed for incomplete data. This sample size is generally in line with other studies that use trait allocation tasks (e.g., Geiger et al., 2006, $N = 61$; Schmidt & Boland, 1986, $N = 86$). Ethical approval was granted by the University of Leeds, School of Psychology Research Ethics Committee (Ref: PSC-772) on 21st October 2019.

4.4.1.2. Procedure

Participants completed one testing session that lasted for approximately 5-10 minutes. The study was hosted online on Qualtrics, which participants accessed from the local participation pool. After providing informed consent and some demographic information (including age, gender, ethnicity), participants were then given a free text box and were assigned a target group (Pregnant Women, New Mother, Men, or Women). Participants were then asked "*Please list as many specific traits and behaviours as possible that you think are associated with [Pregnant Women/New Mothers/Men/Women].*" This was a within-subjects design, thus participants provided traits for all groups. Presentation of groups were randomised, so participants provided traits for each group in random orders. All materials for this study are in Appendix B.

4.4.2. Study 3 Results

4.4.2.1. Analysis procedure

Participants generated an initial list of 988 words and phrases. These were downloaded from Qualtrics into a CSV file for analysis. After removing direct duplicates, the full dataset was then analysed descriptively using a deductive approach to content analysis, using the SCM as the guiding framework (as per Vaismoradi et al., 2013). As per Study 2, the domains of warmth and competence were used as the two core deductive codes, and the textual data was coded as pertaining to either 'warmth', 'competence', or 'neutral' (i.e., neither). Competence was split into 'positive competence' (e.g., "smart", "intelligent") and 'negative competence' (e.g., "weak", "stupid"). Warmth was kept as one factor, because there were no traits or words that fulfilled the criteria of 'low warmth' (i.e., all were positive; "compassionate", "kind"). This study was thus a deductive, rather than an inductive, qualitative study, which is an approach suitable for data which require a "low level of interpretation" (Vaismoradi et al., 2013, p. 399). This approach is inspired by previous literature, including trait generation studies exploring stereotypes about stereotyped groups such as lesbians (Geiger et al., 2006) and older people (Hummert et al., 1994).

4.4.2.2. Warmth and competence frequencies

The frequency of each group's ratings was then investigated, to explore the general stereotyping within each of the domains (i.e., negative competence, positive competence, warmth, and neutral). Multinomial tests of observed proportions were conducted for each of the codes. Out of the 233 codes assigned across the dataset which represented 'positive competence' (e.g., "smart", "strong), men represented the significant majority

of these codes (49.36%), $X^2(3, N = 233) = 125.403, p < 0.001$. Of the 236 codes pertaining to ‘negative competence’ (e.g., “fragile”, “overwhelmed”), pregnant women were significantly most frequently represented (46.19%), $X^2(3, N = 236) 121.593, p < 0.001$. Of the 378 codes referring to ‘warmth’ (e.g., “kind”, “caring”), both women (36.77%) and new mothers (35.98%) represented the significant majority of codes. Finally, both men (34.75%) and pregnant women (40.43%) were also assigned the majority of the 141 traits coded as neutral. Table 4.2 shows counts for each code by assigned group, to allow for comparisons across groups.

Table 4.2. Frequency of negative competence, positive competence, warmth, and neutral codes assigned to each group (new mothers, women, men, and pregnant women).

	Positive competence	Negative competence	Warmth	Neutral	Total
Pregnant women	14	109	64	57	244
New mothers	20	91	136	17	264
Men	115	6	39	49	209
Women	84	30	139	18	271
Total	233	236	378	141	988

4.4.3. Study 3 Discussion

Overall, Study 3 aimed to investigate the specific contents of pregnancy-specific stereotypes using a trait generation task. This is important, in order to establish whether pregnant women do indeed face unique stereotypes in contemporary society, in the way that has been suggested of other groups in previous research. This study found that pregnant women, new mothers, and women were assigned traits which corresponded to warmth and negative competence, whereas men were typically assigned traits associated with high competence. This further

corroborates the findings from Study 2 which demonstrate how pregnant women are viewed to have low competence, as per the concept of 'baby brain'.

4.5. Chapter 4 discussion

Study 2 and Study 3 of this thesis broadly aimed to establish the contents of pregnancy stereotypes. This work sought to ensure that the later empirical experimental studies reported in this thesis that examine whether stereotype activation harms pregnant women's cognitive performance (Chapter 5) reflect *actual* stereotypes that women face in contemporary society. The two studies here have served to generally assess the contents of stereotypes about pregnant women, using Fiske et al.'s (2002) SCM as a theoretical framework. These studies have confirmed that the pregnant women and new mothers are also assigning traits associated with low competence and high warmth (Study 4), thus prompting the benevolent response within the SCM (Fiske et al., 2002). The empirical work discussed in this chapter broadly serve to confirm that pregnant women are stereotyped to have lower competence than other groups, in the way that has been suggested elsewhere in the stereotyping literature. In Study 3, pregnant women fell within the 'paternalistic' quadrant of the SCM taxonomy, which also corroborates the previous literature that shows how pregnant women are subject to protective paternalism, which is linked to benevolent sexism in pregnancy (Chen & Farhart, 2020; Murphy et al., 2011; Sutton et al., 2011).

There are some limitations to both Study 2 and Study 3 that must be acknowledged. Most notably is the cultural homogeneity of both samples

reported here. Participants for both studies were predominately young, White, educated samples that may not represent more nuanced stereotypical views. Both samples were chosen primarily for convenience sampling, but this decision limits the generalisability of the findings. Indeed, some research has identified certain cultural differences that exist in the stereotyping of similar groups. For example, Chrisler et al., (2014) provide evidence for cross-cultural differences in perceptions of women at different stages of reproductive life (Mexico vs US) and found cultural differences in benevolent and ambivalent sexism.

A second limitation is the lack of an intersectional approach to pregnancy stereotypes in both of the studies reported here. Intersectionality theory, which was proposed initial by Crenshaw (1999), highlights how social identities *intersect*; that is, a person typically embodies more than one static social identity. Therefore, this work would be improved if it had assessed not only the views of more a representative sample, but also the contents of stereotypes about the social identity of pregnant women when it intersects with other identities too. For example, there is a small but growing body of literature which explicitly considers how Black American women experience unique stereotypes related to motherhood and sexuality (see Rosenthal & Lobel, 2016). There may also be wider categories of 'mother' and 'pregnant woman' that are not captured in the present two studies. For example, Odenweller et al., (2020) studied the stereotyping of stay-at-home mothers and working mothers and noted that both positive and negative stereotypes about these groups emerged, such that working mothers are perceived to be less dedicated to childcare than stay-at-home mothers

(Etaugh & Nekolny, 1990). This level of detail is not captured in the present work.

4.5.1. Link to Chapter 5

This chapter has identified the contents of pregnancy-related stereotypes, using Fiske et al.'s Stereotype Content Model (1999) as a theoretical framework. These studies confirmed that pregnant women are perceived to have low competence in a wide, non-pregnant population, as per the 'baby brain' stereotype. Therefore, this provides support for the notion that 'baby brain' may be a cultural phenomenon that is perceived by other people. These findings, taken with Study 2's qualitative finding that pregnant women also self-report changes to the memory, broadly serve to confirm that pregnant women are stereotyped to have lower competence than other groups, in the way that has been suggested elsewhere in the stereotyping literature. As discussed in Chapter 2, this thesis will now turn its attention to investigations of how activation of the self-applicable 'baby brain' stereotype may harm women's performance, in pregnancy and into early motherhood.

Chapter 5: Is stereotype threat an explanation for 'baby brain'?

5.1. Chapter overview

The earlier studies in this thesis reported the idea that pregnant women self-report negative memory changes (Chapter 2) and perceptions of low competence in pregnant women is generally held by a general population (Chapter 3). The following studies will now move on to investigating social cognitive explanations for memory changes in pregnancy. This chapter presents two empirical studies which aimed to test whether women's cognitive impairment in pregnancy can be explained by stereotype threat theory (Steele & Aronson, 1995). As discussed throughout Chapter 2, this theory generally proposes that activation of negative stereotypes about self-applicable groups can harm cognitive performance. Study 4 ($N = 364$) investigated stereotype threat effects in a 2 (Condition: stereotype threat vs no threat) x 3 (Group: pregnant women vs new mothers vs never-pregnant female control) design, with memory performance as the outcome variable. A main effect of Group on memory performance was observed, such that pregnant women and new mothers performed worse than other groups on two memory tasks, but no other main or interactive effects. Study 5 ($N = 409$) then aimed to conceptually replicate this study with the same sample and design, but this time with mathematics ability, memory, and attention as dependent variables. Again, it was found that a stereotype threat manipulation did not impair pregnant women and new mothers' cognitive performance, nor were there any interactive effects. In this study, groups also did not differ in their performance across the tasks. These results are discussed here in the context of stereotype threat

mechanisms, calling into question whether a stereotype threat paradigm is a compatible theory for understanding 'baby brain' in pregnancy.

5.2. Introduction

As discussed in the literature review of Chapter 2, stereotype threat theory (Steele & Aronson, 1995) suggests that when a self-applicable negative performance stereotype about one's ingroup is made salient, a performance inhibition effect can occur. So far in this thesis, the empirical studies have confirmed that (a) this stereotype of pregnant women having lower competence compared with other groups is generally held (Chapter 4), and (b) pregnant women self-report negative changes to their memory throughout their pregnancy (Chapter 3). One explanation of stereotype threat effects is that exposure to negative stereotype-related information consumes one's working memory, which thus interferes with ability to perform well at a task at hand (Schmader & Johns, 2003). These effects have been widely reported across experimental studies in the literature, particularly in the context of understanding girls' underperformance in mathematics tasks (Doyle & Voyer, 2016; Martens et al., 2006; Shapiro & Neuberg, 2007). In the present work, given how pregnant women and new mothers are stereotyped as having poorer cognitive performance relative to other groups (see Chapter 4), it is theorised that stereotype threat theory may account for differences in cognitive performance of this group. Therefore, this gendered stereotype may also have potential to threaten members of the groups' performance when the stereotype is explicitly activated.

5.3. Study 4

To empirically explore the research question that stereotype threat may provide insights in the ‘baby brain’ phenomenon, Study 4 tested whether a stereotype threat manipulation containing information related to pregnant women’s cognitive abilities (i.e., ‘baby brain’) may significantly disrupt pregnant women’s performance on a memory task. For this initial experimental study, memory recall was selected as the outcome measure, due to evidence that suggests the ‘baby brain’ stereotype is most strongly associated with performance in this domain (e.g., Henry & Sherwin, 2012; Sharp et al., 1993) and previous cognitive research has shown pregnancy-related memory deficiencies (Davies et al., 2018). Immediate recall memory is most frequently cited as a symptom associated with ‘baby brain’ across both self-report (Crawley et al., 2008) and objectively measured research paradigms (Brett & Baxendale, 2001; Casey et al., 1999; Cuttler et al., 2011; de Groot et al., 2006; Sharp et al., 1993); therefore, while many facets of ‘cognitive functioning’ are seemingly debilitated by pregnancy, memory recall is the most common and the most compatible with the stereotype threat paradigm. Studies 4 and 5 reported here both tested stereotype threat effects in pregnant women, as well as mothers with children under two years old, due to neurological evidence to that objective ‘baby brain’ effects exist in both groups (Hoekzema et al., 2017).

In Study 4, it was hypothesised that pregnant women and women with young children in a stereotype threat condition (i.e., who receive an explicit activation of the ‘baby brain’ stereotype) will then display weaker memory performance, compared with pregnant women and new mothers who are not exposed to threatening information. It was also predicted that

pregnant women and new mothers would not significantly differ from one another; that is, 'baby brain' stereotype will affect both motherhood groups equally, and both groups will generally underperform compared with a never-pregnant female control. It was further hypothesised that there would be a significant interaction between group and stereotype threat condition, such that pregnant women and new mothers in the threat condition would perform worse than (a) those in the never-pregnant control group (b) those who do not receive a stereotype threat. In this sense, this study hypothesised that while pregnant women and new mothers will show a memory deficit effect, this difference will be *exacerbated* or worsened by the presence of a stereotype threat. That is, even if biological differences exist, a stereotype threat manipulation should, in theory, exacerbate performance decrements, thus having an *additive* effect on performance (Sekaquaptewa & Thompson, 2003; Stone & McWhinnie, 2008; Woodcock et al., 2012).

5.3.1 Study 4 Method

5.3.1.1 Participants and design

An *a priori* power calculation using software G*Power (Faul et al., 2007) indicated that in order to achieve 80% statistical power with an effect size of 0.17 (the lower bound effect size found in Nguyen & Ryan's meta-analysis for blatant stereotype threat manipulations) and an alpha level of 0.05, the sample size should be 337, with six independent groups (approximately 57 participants per group). This is to power a 2 x 3 ANOVA, testing for both main effects and interactions. Note that there have been concerns over publication bias inflating effect sizes of Nguyen and Ryan's (2008) meta-analysis (Zigerell, 2017) but, given that there is no recent meta-

analysis of stereotype threat effects in this context, lower bound effect size of interest as reported in the 2008 analysis were used in the power analysis.

Participants were primigravid (first-time) pregnant women ($N = 102$; $M_{age} = 27.97$, $SD = 6.05$), new mothers (defined as women with a child less than two years old) ($N = 126$; $M_{age} = 30.98$, $SD = 5.70$), or a never pregnant female comparison group ($N = 136$; $M_{age} = 20.62$, $SD = 4.2$). The study was built online on Qualtrics. Control participants were recruited from the University of Leeds participant recruitment pool and survey share platforms (e.g., Survey Circle). Pregnant women and new mothers were recruited from Prolific Academic and social media, to allow for more targeted sampling, given the specificities of the participant group. The majority of participants were White British (68%) and currently in paid employment (60.1%).

Participants were randomly assigned to receive one of two experimental conditions: stereotype threat manipulation or a control (no stereotype threat), using the 'evenly present elements' survey flow function in Qualtrics. A chi-squared test confirmed successful randomisation, in that there were no significant differences between group allocation to condition ($p = 0.425$). Breakdown of participant allocation to each condition is displayed in Table 5.1. The study followed a 2 (condition: stereotype threat vs. control) x 3 (group: pregnant women vs. new mothers vs. never pregnant controls) between-groups design. Ethical approval was granted by the University of Leeds School of Psychology Research Ethics Committee. (Ref: PSC-673) on 16th April 2019.

Table 5.1. Number of participants allocated to condition by group in Study 4.

Group	Condition		
	Stereotype threat	Control	Total
Pregnant women	43	59	102
New Mothers	64	62	126
Never Pregnant	65	71	136
Total	172	192	364

5.3.2. Procedure

Participants completed one online testing session that lasted approximately 20 minutes. Online testing was deemed appropriate for this study largely due to feasibility concerns and evidence that participants tested online do not differ substantially from participants tested in the lab (Casler et al., 2013). The theoretical implications of online testing in this context are discussed in more detail in the discussion chapter of this thesis (Chapter 7). Participants first read an information sheet detailing the study's procedure, and gave informed consent, before answering demographic questions (age, occupation, marital status, education, and ethnicity). Pregnant participants were asked to identify which trimester of pregnancy they were currently in. Participants were randomly assigned to receive either the stereotype threat information or a control, before completing two memory measures (detailed below). In exchange for participation, participants were entered into a prize draw for shopping vouchers. All materials for this study are available in Appendix C.

5.3.3. Measures

All measures are described in sequential order in the study. All participants received materials in the same order and no counterbalancing was used. Note that as exploratory measure, participants also completed the short-form Feminist Identity Development Scale (Bargad & Hyde, 1991) and a short-form version of the Big 5 personality scale (Rammstedt, & John, 2007). These measures are not further reported or analysed here.

5.3.3.1 Stereotype threat manipulation

In the experimental stereotype threat condition, participants were told "*Research shows that due to a phenomenon known as "baby brain", pregnant women and women with young children tend to perform worse on these kind of tasks*". In this condition participants were asked to identify whether they were aware of the term 'baby brain' and were asked to give a brief definition. In the control condition, participants were told "*Research has not found any differences between pregnant women and non-pregnant women on these kinds of tasks*". This constituted the stereotype threat manipulation. This type of manipulation has been used in previous stereotype threat literature (e.g., Lesko & Corpus, 2006), and represents a 'nullified' control condition, where there is an "active threat removal" (Flore & Wicherts, 2015, p. 32) rather than an absence of information about the stereotype.

5.3.3.2. Verbal word learning tasks

Participants were asked to complete two modified versions of Verbal Word Learning Task (VWLT; adapted from de Groot et al., 2006). The first VWLT showed participants a list of 14 common monosyllabic shopping-list

items (e.g., ham, eggs, bread, jam, rice). Each word was presented in isolation to participants in the middle of a white screen and were automatically replaced after two seconds. After viewing all 14 words, participants were asked to free recall as many as they could using a text box using the computer keyboard (see Figure 5.1).

The second VWLT was adapted for the purpose of this study. This replicated the previous VWLT, but with unrelated monosyllabic nouns rather than food items (e.g., house, gate, hand, yarn). The second task was included due to evidence that suggests that pregnant women differ in their memory performance when tested through applied versus laboratory-based measures (Cuttler et al., 2011). Additionally, this measure allowed comparison with the VWLT shopping list above, because shopping lists often consist of finite and thematically similar items, thus the unrelated nouns list acted a control for guessing on the VWLT shopping list. The procedure was identical to the shopping list VWLT.

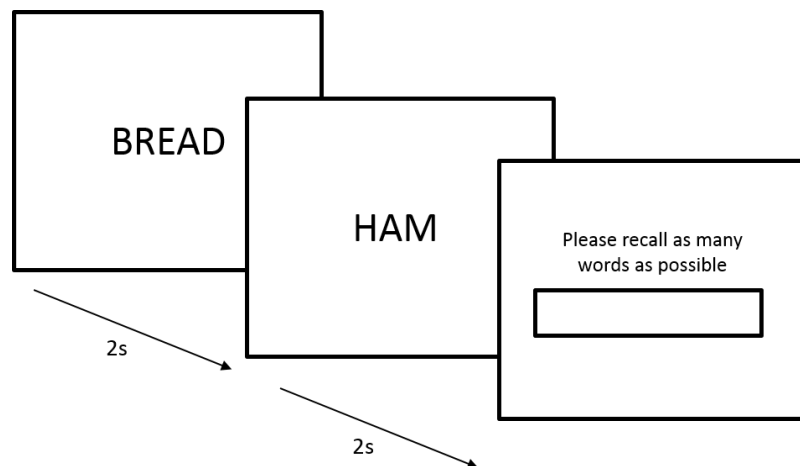


Figure 5.1. Verbal Word Learning Task Procedure in Study 4.

5.3.3.3. Domain identification

Participants were then asked to identify the extent to which they value their memory (*'it is important to me that I have a good memory', 'I have a good memory'*) on a 5-point Likert scale, (1 = *Strongly disagree*, 5 = *Strongly agree*). Pregnant women and women with young children were asked to identify the extent to which they agreed with the statement *'it important to me that I am not perceived to have 'baby brain''*. This is due to evidence that suggests stereotype threat effects are only found when individuals under threat value the targeted domain (Appel et al., 2011)

5.3.3.4. Motherhood social identity

Pregnant women and women with young children were asked to complete a brief 4-item motherhood social identity identification measure, which included items such as *'Being a mother is an important part of my self-image'* and reverse-score items *'Being a mother has little very little to do with how I feel about myself'*. Participants indicated their agreement on a 5-point Likert Scale (1 = *Strongly disagree*, 5 = *Strongly agree*). This measure was included to assess the extent to which participants align themselves with the social identity under threat, which is a key factor in stereotype threat theory (Shih et al., 1999).

5.3.4. Study 4 Results

5.3.4.1. Confirmatory Results

Two separate between-subjects ANOVAs were conducted to explore the hypotheses. The first was a 2 x 3 ANOVA. The independent variables were 'Group' which had three levels: primigravid pregnant women, new mothers, and non-pregnant controls, and Condition, which had two levels:

stereotype threat and control. The dependent variables were the number of correctly recalled words in the VWLT Tasks, which was calculated by summing correctly recalled items in participants free-text responses.

5.3.4.1.1. Verbal Word Learning Task 1

An ANOVA first confirmed that demographic factors did not impact recall on VWLT1; there was no significant main effects of ethnicity ($p = 0.26$), education level ($p = 0.33$), employment status ($p = 0.45$) or marital status ($p = 0.09$) on recall in this task. A linear regression also confirmed that participants' age did not independently predict recall on VWLT1 ($p = 0.76$). This ruled out the issue of demographics as confounds.

A 2 (Condition: stereotype threat vs control) x 3 (Group: pregnant women vs new mothers vs never pregnant control) ANOVA showed a significant main effect of Group, $F(2, 337) = 5.669$, $p = 0.004$, $\eta^2 = 0.033$. Follow-up post-hoc tests with Bonferroni corrections indicated that pregnant women ($M = 7.94$, $SD = 2.42$) recalled significantly fewer words than both new mothers, ($M = 8.75$, $SD = 2.27$, $p = 0.025$, 95% CIs [-1.57, -0.06] and controls, $M = 8.91$, $SD = 2.17$, $p = 0.004$, CIs [-1.71, -.23]. New mothers and controls did not significantly differ from one another, $p = 1.00$, CIs [-.85, .54] (see Figure 5.2). Contrary to hypotheses, there was no significant main effect of stereotype threat Condition, $F(1,337) = 0.38$, $p = .537$, $\eta^2 = 0.001$, nor was there a significant interaction between Group and Condition, $F(2,337) = 0.67$, $p = 0.514$, $\eta^2 = 0.004$.

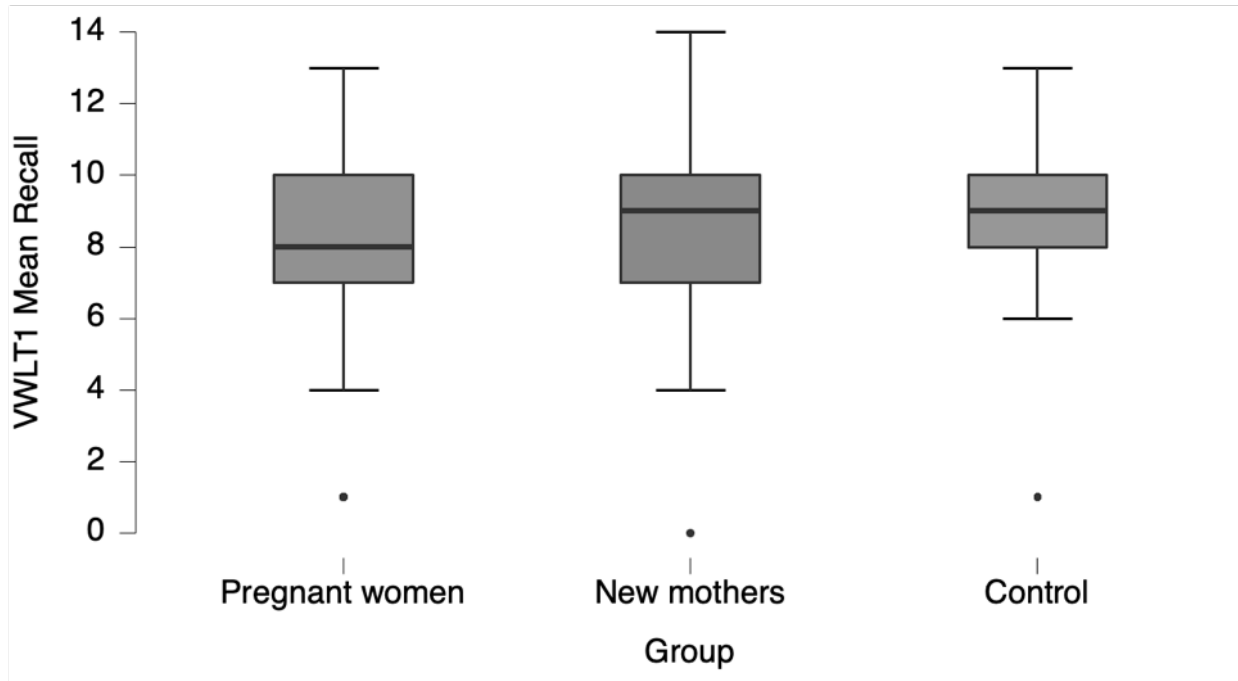


Figure 5.2. Mean number of words recalled in the VWLT shopping list task per group in Study 4. Bars represent standard error, dots represent outliers.

5.3.4.1.2. Verbal Word Learning Task 2

As with VWLT1, memory performance (again, indexed by number of correctly recalled words) in VWLT2 was not affected by participants' demographic factors. An ANOVA confirmed that there were no significant main effects of ethnicity ($p = 0.32$), education level ($p = 0.79$), employment status ($p = 0.86$) or marital status ($p = 0.26$) on recall in this task. A linear regression also confirmed that participants' age did not independently predict recall on VWLT2 ($p = 0.13$).

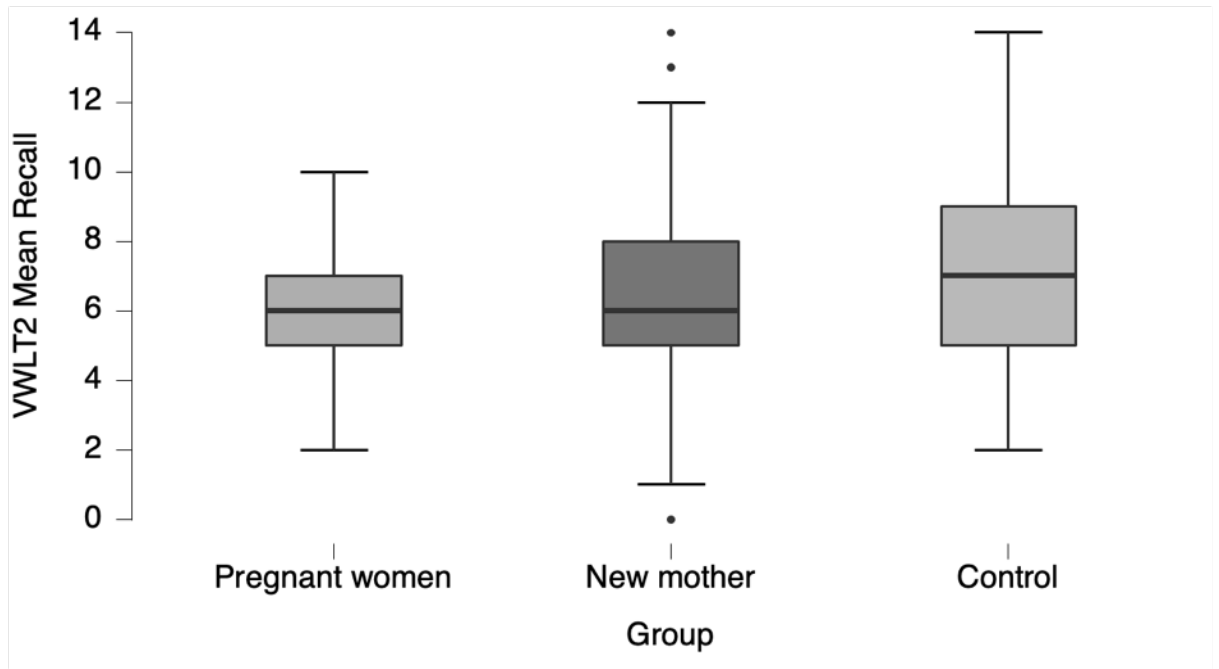


Figure 5.3. Mean number of words recalled in the VWLT unrelated nouns task per group in Study 4. Bars represent standard error, dots represent outliers. Note here that one participant scored zero in VWLT2, and two participants got all answers correct. Testing whether these outliers impacted overall results found that they did not, and so these outlying scores were retained for the analysis.

A second 2 x 3 ANOVA was conducted, this time with performance on the unrelated noun VWLT as the dependent variable. Again, there was a significant main effect of group, $F(2,327) = 8.43$, $p < 0.001$, $\eta^2 = 0.049$. Follow-up post-hoc tests with Bonferroni corrections indicated that pregnant women ($M = 6.08$, $SD = 1.96$) recalled significantly fewer words than controls ($M = 7.31$, $SD = 2.51$), $p < 0.001$, 95% CIs [-1.99, -0.45], but this time performed similarly to new mothers ($M = 6.41$, $SD = 2.34$), $p = 0.975$, CIs [-1.10, 0.46]. New mothers performed significantly worse compared with controls $p = .008$, 95% CIs [-1.62, -0.18]. Contrary to hypotheses, there was no significant main effect of condition, $F(1,327) = 0.66$, $p = .419$, $\eta^2 = 0.002$, nor was there a significant interaction between group and condition, $F(2,327) = 0.078$, $p = 0.925$, $\eta^2 < 0.001$.

5.3.4.2. Exploratory Results

5.3.4.2.1. 'Baby brain' importance as a moderator

As an exploratory test, it was investigated whether perceived memory ability, importance of memory, and importance of not being perceived to have 'baby brain' correlated with actual performance on both VWLT tasks (see Table 5.3). This showed that there was a strong significant correlation between self-reported memory and recall on VWLT1 ($R = 0.166$, $p = 0.009$), but not with VWLT2. Therefore, participants who value their memory generally have better recall than those who don't. Then, to test whether importance of not being perceived to have 'baby brain' moderated the significant relationship between Group and recall, moderation analysis was conducted. Overall, the moderation model was not significant $F(3,139) = 1.55$, $p = 0.205$. The addition of a 'baby brain' importance*Group interaction term ($\beta = 0.543$, $p = 0.105$) increased the R^2 by 0.035, but this was not statistically significant. There was also no evidence of moderation in VWLT2.

Table 5.3. Intercorrelation of variables.

	1	2	3	4
1. I have a good memory	—			
2. It is important that I remember things	0.253***	—		
3. Baby brain importance	0.204*	0.237**	—	
4. VWLT1 Recall	0.166**	0.001**	-0.005	—
5. VWLT2 Recall	0.099	0.084	0.151	0.449***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3.4.2.2. Age effects

As a second exploratory analysis, it was tested whether participants' age impacted number of items correctly recalled on the Verbal Word Learning Task in order to rule out the theory that Group only affected recall due to age differences on VWLT1. This indicated Group independently explained 2.3% of overall variance, $F(1,340) = 9.05$, $p = 0.003$ in word recall on the first task. When participants' age was accounted for, adjusted R^2 increased to 3.2%, $F(2,340) = 6.59$, $p = 0.002$, meaning that changes in word recall were thus significantly associated with the addition of age as a factor $p = 0.045$, adjusted R^2 change = 0.009.

5.3.4.2.3. Social identity as a moderator

To test whether motherhood social identity moderated the significant relationship between Group and recall, moderation analysis was conducted. This was to test whether identification with the identity under threat (i.e., 'motherhood', in this instance) affects susceptibility to a stereotype threat (Nosek et al., 2002). The moderation model, which included Group as the independent variable, motherhood social identity as a moderator, and recall on VWLT as the outcome was not significant, $F(3,107) = 2.324$, $p = 0.079$. The addition of the Motherhood social identity*Group interaction term ($\beta =$

0.157, $p = 0.756$) increased the R^2 by 0.001, which was also not statistically significant. Thus, there was no evidence for moderation.

5.2.5. Study 4 Discussion

Overall, this initial stereotype threat study extended the application of stereotype threat theory and used the theory to test a novel stereotype-performance dyad, the 'baby brain' stereotype and associated memory ability in pregnant women. Study 4 demonstrated that pregnant women generally underperformed in memory-based tasks compared with new mothers and female controls. This finding was stable across the two objective memory measures. However, contrary to the hypotheses, the activation of a negative performance stereotype did not significantly impact memory performance. There was also no significant interaction between the stereotype threat condition and group, which was also not aligned with the original hypotheses.

Ostensibly, these results could appear to support the notion that 'baby brain' is a genuine, physiological phenomenon, owing to, for example, hormonal changes in pregnancy (e.g., Henry & Rendell, 2007). However, the lack of stereotype threat effects in the results may also be due to a number of more theoretical or contextual factors. For example, research shows that stereotype threat effects may only be present if certain specific moderators (e.g., Shapiro, & Neuberg, 2007) or mediators (Pennington et al., 2016) are accounted for. Given the novelty of the present work, these results must be interpreted with caution. Since this is the first study that assesses the capacity of stereotype threat to explain cognitive decline in pregnancy, further work now should extend this line of questioning in order to paint a more complete picture of the utility of the theory within the context of

understanding 'baby brain'. It is also important to fully stratify the concept of 'baby brain' in testing concepts. Immediate memory recall, as used in this work, is only one of the various cognitive areas thought to be associated with cognitive decline in pregnancy and into new motherhood (Davies et al., 2018). Therefore, the impact of stereotype threat on wider aspects of women's cognitive ability during pregnancy will now be tested in Study 5.

5.4. Study 5

Study 5 was a conceptual replication of the stereotype threat paradigm presented in Study 4. This aimed to respond to Crandall and Sherman's (2016) notion that conceptual replications in social psychology are required to enhance confidence in theoretical hypotheses. Study 5 tested the stereotype threat experimental paradigm, again, with 1) an identical stereotype threat manipulation and 2) pregnant women, new mothers, and a never-pregnant female comparison group as participant groups. However, Study 5 also aimed to extend and diversify the outcome measure of 'baby brain' to include more diverse facets of cognitive functioning, rather than focusing on memory ability alone. This is due to research which suggests that the 'baby brain' concept may extend beyond memory capacity alone and also represent deficits in a wider range of cognitive abilities (Davies et al., 2018), including executive control and general cognition (e.g., de Groot et al., 2006; Onyper et al., 2010).

Study 5 thus aimed to broaden the original theoretical hypotheses, testing whether group effects replicate in wider cognitive domains: memory, executive control, and mathematics. These outcome measures have all been used to objectively test pregnant women's cognitive functioning from a neurocognitive perspective in previous research (e.g., Brindle et al., 1991;

Henry & Rendell, 2007; Raz, 2014). Therefore, it was expected that pregnant women's and new mothers' potential (under)performance in these wider cognitive domains will also fit within the 'baby brain' social stereotype.

In directly replicating the stereotype threat manipulation with a broader range of outcome variables, this allows a more thorough investigation into whether stereotype threat or group effects, or interactions between the two, are affected by the nature of threat itself or the measure of performance. Therefore, in Study 5, it was hypothesised that there would again be a significant main effect of Group, such that pregnant women and new mothers would both underperform across three cognitive tasks, compared with a never-pregnant female control, but not when compared with one another. It was also hypothesised that pregnant women and new mothers in the stereotype threat group would perform worse than those who do not receive the threat; never-pregnant female controls will not be affected by the stereotype threat content. In other words, as per the hypotheses outlined in Study 4, it was predicted that stereotype threat would have an *additive* effect (Sekaquaptewa & Thompson, 2003; Stone & McWhinnie, 2008). That is, the presence of a threat will *exacerbate* existing deficiencies in pregnant women and new mothers' cognitive ability that occur due to biological changes.

5.4.1. Study 5 Method

5.4.1.1 Participants and design

An *a priori* power calculation using software G*Power (Faul et al., 2007) indicated that to achieve 85% power and to detect an observed η^2 of 0.033 (converted to a Cohen's *f* of 0.18, as per the original study of which

this replication is based) and an alpha of 0.05, that the sample size should be at least 341, with six independent groups. Again, this allows us to test a 2 x 3 ANOVA with main effects and interactions. As with Study 4, participants were primigravid pregnant women ($N = 130$), new mothers with a child less than two years old ($N = 110$), and female never-pregnant control group ($N = 169$), see Table 5.2 for breakdown of participant group by condition. The mean age was 30.59 ($SD = 6.13$). The majority of participants were employed (75.1%), White British (60.9%) and educated to a bachelor's degree level (71.7%). Ethical approval was granted by the University of Leeds School of Psychology Research Ethics Committee (Ref: PSC-878) on 31st January 2020.

This time, participants were all recruited on Prolific Academic and custom pre-screening was applied. As an amendment to Study 4, control group participants (i.e., never-pregnant females) had to be 25 years or older, in order to roughly age-match this group with the pregnant women and new mothers. Participants registered with Prolific Academic must have indicated that they are female and answered 'yes' to the 'I am currently pregnant' screening item on Prolific (for the pregnant women group). Participants were paid the equivalent of £5.50 per hour to complete the experiment, which took 10-15 minutes to complete. This study again followed a 2 (Condition: stereotype threat vs control) x 3 (Group: pregnant women vs new mothers vs control) between-subjects design. Twelve participants failed the attention check (i.e., they did not select 'Agree' when asked 'choose Agree for this question') and therefore, their data was omitted from further analyses, leaving a final dataset of 128 pregnant women, 109 new mothers, and 160 controls.

Table 5.2. Number of participants allocated to condition by group in Study 5.

Group	Condition		
	Stereotype threat	Control	Total
Pregnant women	61	69	130
New Mothers	58	52	110
Never Pregnant (control)	85	84	169
Total	204	205	409

5.4.1.2. Study 5 procedure

The experiment procedure was built in the experimental software Gorilla Experiment Builder (www.gorilla.sc; Anwyl-Irvine et al., 2019). Participants completed one online testing session that lasted approximately 15-20 minutes. Participants first read an information sheet detailing the study's procedure before answering demographic questions (age, occupation, marital status, education, and ethnicity) and providing informed consent. Participants were randomly assigned to receive either the 'baby brain' stereotype threat or a control, before completing three measures of cognitive ability: mathematics, executive control, and memory.

5.4.2. Measures

This study was preregistered on the preregistration server AsPredicted on 26th February 2020 (Ref: #36324; <https://aspredicted.org/blind.php?x=6vm8im>). All measures and materials can be accessed via the Gorilla Open Materials link here: <https://gorilla.sc/openmaterials/80176>. As a methodological amendment from Study 4, in Study 5, all three tasks were counterbalanced in Gorilla using the counterbalancing 'node'.

5.4.2.1. Stereotype threat manipulation

In the randomly assigned experimental condition, participants were exposed to the same stereotype threat as Study 4: "*Research shows that due to a phenomenon known as "baby brain", pregnant women and women with young children tend to perform worse on these kind of tasks"*.

Participants in the threat condition were asked to identify whether they were aware of the 'baby brain' concept (yes, no). In the control condition, participants were told "*Research has not found any differences between pregnant women and non-pregnant women on these kinds of tasks"*.

5.4.2.2. Mathematics ability

To test mathematical ability, participants were shown short mathematics questions, of which were based on either arithmetic (e.g., '10 – 4 = ?') or knowledge (e.g., 'How many weeks in a year?'). These questions were sourced and adapted from Gorilla's bank of experimental materials (<https://gorilla.sc/openmaterials/80176>). Participants were asked to write their answer using the keyboard and press the enter button when complete. Each question timed out after 5000ms. There was a 200ms delay between each question. Participants were awarded one mark for every correct item. There were 17 items in total, 11 arithmetic and 6 knowledge based. All questions were designed to be of equal difficulty. Items to all subsections of the mathematics questions were computed into one mean score.

5.4.2.3. Executive control

As a test of participants' executive control, participants were asked to complete a modified version of the Flanker Task (Eriksen & Schultz, 1979). For the purpose of this experiment, the stimuli were animated fish (see

Figure 5.4). Participants were told to press the 'F' key on their computer keyboard if the target fish, at the centre of the screen, was swimming to the Left, and the 'J' key if the fish was swimming to the Right. There were four practice trials and 17 experimental trials. In this task, participants must ignore peripheral attentional cues (distractor fish) and make decisions about the immediate focal stimuli. Number of correct responses were recorded.

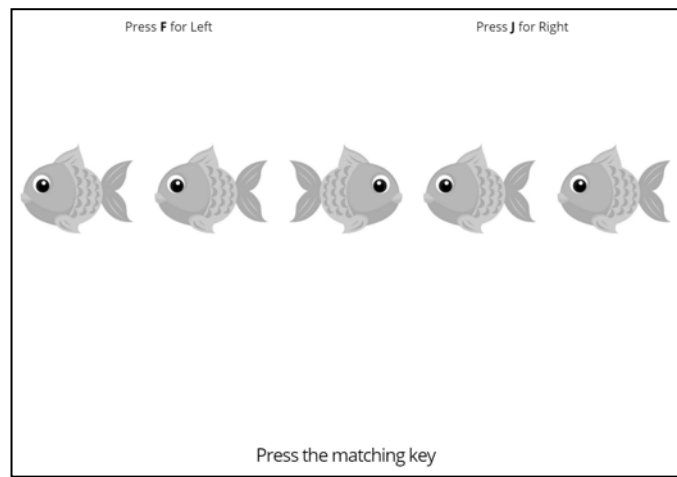


Figure 5.4. Flanker Task participant display in Study 5.

5.4.2.4. Memory ability

To test memory performance in a task different from the VWLT of Study 4, the Levels of Processing task (Craik & Lockhart, 1972). In the Levels of Processing task, participants are shown a word (e.g., 'floor') and are asked questions which relate to its structure (e.g., 'does the word have four letters?'), phonemic features (e.g., 'does the word rhyme with [word]?'), or semantics (e.g., 'does the word fit into this [sentence]?'). The words automatically advanced to the next screen after 2000ms. There were 30 trials, with 10 phonemic questions, 10 structural, and 10 semantic. Participants were awarded one point for each correct answer.

5.4.2.5. Manipulation check

As a methodological refinement to Study 4, in this study, a manipulation check was included. Participants in the stereotype threat condition were told “*Earlier in this experiment you were told some information about pregnant women's cognitive abilities*” and were asked to identify the content of this information from a drop-down list with four options (‘pregnant women have [worse/better] cognitive abilities compared with other groups’, ‘there are no differences in the cognitive abilities of pregnant women compared with other groups’ or ‘I don’t remember’).

5.4.2.6. Stereotype endorsement

To check for participants’ endorsement of the stereotype, participants were asked “*Do you think pregnant women do have reduced cognitive abilities (i.e., poorer memory, planning, and attention) compared with other groups of people*” (yes, no, unsure). This was adapted from Jamieson and Harkins (2009).

5.4.2.7. Cognitive ability identification

Due to evidence that suggests that participants’ value of the domain under threat (i.e., in this case, cognitive functioning) affects susceptibility to a stereotype threat that targets the domain, participants answered a 5-item measure of cognitive ability identification. This included items such as ‘*I think I have good cognitive abilities*’ and ‘*it is important to me that I am perceived to be intelligent*’ on a 1 (strongly disagree) to 7 (strongly agree) Likert scale. This was adapted from Spencer et al.’s (1999) work on mathematics ability identification. Cronbach alpha showed that cognitive identification had a satisfactory internal reliability ($\alpha = 0.73$).

5.4.2.8. Attention check

As a further amendment to Study 4, Study 5 included an attention check. Participants were asked to '*Select 'Agree' for this question*' on one item, to check their attention. This is to ensure that participants included in the final dataset were suitably attentive to the study.

5.4.2.9. Motherhood social identity

As per the previous study, new mothers and pregnant women answered a four-item measure of motherhood social identity, including items such as '*Being a mother is important for my self image*) with two items reverse-scored (e.g., *Being a mother has very little to do with how I feel about myself*). This involved four statements and participants indicated their agreement on a 1 (strongly disagree) to 7 (strongly agree) Likert scale. Cronbach alpha showed that cognitive identification had a satisfactory internal validity ($\alpha = 0.78$).

5.4.3. Study 5 Results

The number of correct responses to each of the three tasks were summed to create one index per task that represented overall performance. First, attention and manipulation checks were analysed before conducting three separate 2 x 3 between-subjects ANOVAs for each of the key dependent variables: performance on the Flanker Task, mathematics task, and Levels of Processing task. Any significant main effects of group were followed up with post-hoc comparisons with Bonferroni corrections. When there is a significant effect of group on performance, moderated regression with group as the predictor, performance on each task as the outcome, and cognitive identification as the moderator were conducted, to test whether

identification in the domain of threat affects susceptibility to negative performance effects.

A MANOVA with performance on all three tasks as the outcome variable confirmed that there was no main effect of age in performance on either the Levels of Processing task ($p = 0.21$), Flanker task ($p = 0.47$) or maths task ($p = 0.22$).

Responses to the manipulation check were analyzed using a Chi-Squared test to check that participants in the stereotype threat condition could correctly identify the contents of the stereotype threat. There was a significant effect of condition on information identification $X^2(3, N = 397) = 210.97, p < 0.001$, such that the vast majority participants in the stereotype threat condition were able to correctly identify the contents of the stereotypical information (69.19%, $N = 137$) and participants in the control condition were also able to identify the contents of the control information (83.42%, $N = 155$).

To test the effects of group and stereotype threat condition on performance on the executive control, measured through the Flanker Task, a 2 (Condition: stereotype threat vs control) x 3 (Group: pregnant women vs new mothers vs never pregnant control) ANOVA was conducted, with performance on the Flanker task as the dependent variable. This revealed no significant main effect of Group, $F(2,390) = 2.110, p = 0.123, \eta p^2 = 0.01$, no significant main effect of Condition, $F(1,390) = 0.43, p = 0.514, \eta p^2 = 0.001$, and no interaction between the two variables, $F(2,390) = 0.66, p = 0.52, \eta p^2 = 0.003$.

A second 2 (Condition: stereotype threat vs control) x 3 (Group: pregnant women vs new mothers vs never pregnant control) ANOVA, with

performance on the mathematics task as dependent variable revealed a significant main effect of Group, $F(2,390) = 5.84$, $p = 0.003$ $\eta p^2 = 0.003$. Post-hoc tests with Bonferroni corrections showed that new mothers performed significantly better ($M = 13.02$, $SD = 2.08$) than controls ($M = 12.04$, $SD = 2.84$) $p = 0.004$ CIs [0.25, 1.71]. Pregnant women performed marginally significantly better ($M = 12.75$, $SD = 2.25$) than controls, $p = 0.045$ CIs [-1.41, -0.01], but there were no differences between pregnant women and new mothers $p = 1.00$. There was also no main effect of stereotype threat condition, $F(1,390) = 1.203$, $p = 0.273$, $\eta p^2 = 0.003$, and no significant Group*Condition interaction $F(2,390) = 2.024$, $p = 0.133$, $\eta p^2 = 0.01$. To test whether self-perceived importance of cognitive ability moderated the impact of Group on mathematic ability, a moderation analysis was run. While the overall model was significant, $F(3,395) = 5.440$, $p = 0.001$, the Group*Cognitive ability identification interaction term was not significant, $b = 0.05$, $p = 0.871$, which indicates that this variable did not moderate the relationship.

Finally, a 2 x 3 ANOVA with performance on the Levels of Processing task revealed no significant main effects for either group, $F(2,390) = 0.57$, $p = 0.57$, $\eta p^2 = 0.004$ or condition, $F(1,390) = 0.003$, $p = 0.96$, $\eta p^2 = 0.00$ and no interaction, $F(2,390) = 0.25$, $p = 0.78$, $\eta p^2 = 0.001$.

5.4.3.1. Exploratory results

As per Study 4, an exploratory analysis, it was tested whether participants' age impacted mathematics ability. A regression confirmed that age did not significantly predict performance on this task ($p = 0.09$), which ruled out the theory that Group only affected recall due to age differences on maths ability.

It was investigated whether endorsement of the 'baby brain' stereotype was affected by group and condition. This is due to evidence which suggests that endorsement of the stereotype may affect susceptibility to stereotype threat (Schmader et al., 2004). As stereotype endorsement was a categorical outcome (yes, no, unsure), two Pearson Chi-Squared tests were conducted. This revealed a significant effect of group, $X^2(4, N = 397) = 57.79 p < 0.001$, in that pregnant women and new mothers were more likely to endorse the stereotype, whereas never-pregnant controls were more likely to refute it. There was also a significant effect of condition, $X^2(2, N = 397) = 9.22 p = 0.01$, in that those in the stereotype threat condition endorsed the stereotype more than those in the control condition. To test whether these variables *interacted* to impact endorsement of the stereotype, the data was split by Condition and the Chi-Squared analysis run again, which showed that in the stereotype threat condition, pregnant women and new mothers were generally more likely to agree with the stereotype compared with controls, $X^2(4, N = 198) = 35.988 p < 0.001$, with the inverse true for the no stereotype threat condition $X^2(4, N = 199) = 24.986 p < 0.001$. This provides early evidence to suggest that activating the stereotype made pregnant women and new mothers more likely to agree with the 'baby brain' stereotype.

It was also tested whether pregnant women and new mothers in the stereotype threat condition were generally more *aware* of the 'baby brain' stereotype (by way of answering 'yes' to the 'are you familiar with the term 'baby brain' as part of the threat manipulation). This revealed a significant association, $X^2(2, N = 203) = 44.4 p < 0.001$, in that pregnant woman

(90.1%) and new mothers (91.4%) were more likely to answer yes, compared with never pregnant controls (48.8%).

5.4.4. Study 5 Discussion

To summarize, Study 5 demonstrated a relatively similar pattern of results to Study 4. Activation of the 'baby brain' stereotype threat manipulation did not impact women's cognitive performance in the way that was hypothesized. However, given that there is a growing body of literature scrutinizing the social basis to baby brain (e.g., Crawley et al., 2008; Hurt, 2011; Pownall, 2019), coupled with the pervasive research that points to the stereotyping that women face in their pregnancy and into motherhood (Ganong, & Coleman, 1995; Halpert et al., 1993; Shields & Cooper, 1983), this should be scrutinized further before any concrete conclusions are drawn.

This study also suggests that pregnant women and new mothers are more aware of the 'baby brain' stereotype, which suggests that the stereotype is more widely known to groups that are targeted by it. This is corroborated by Hurt's (2011) notion that 'baby brain' is communicated regularly to women throughout their pregnancy through media, television, and cultural discourse. This is perhaps unlike other stereotypes, such as the 'women are poorer at maths' stereotypes, which are more universal and widely recognized. Future work into the baby brain phenomenon may wish to explore this further, testing the extent to which the stereotype is widely endorsed by different groups and contexts.

5.5. Chapter 5 Discussion

This work aimed to empirically assess whether pregnant women's cognitive performance is worsened with a stereotype threat manipulation

containing information about the 'baby brain' stereotype. This research question was tested across two studies and found that generally, there was no support for the hypothesis that stereotype threat undermines pregnant women's performance in this specific testing context. A number of interesting findings did emerge. For example, Study 4 demonstrated that pregnant women generally underperformed in memory-based tasks compared with new mothers and female controls. However, counter to hypotheses, the presence of a negative performance stereotype did not significantly impact memory performance. There was also no interaction between the stereotype threat condition and group, which was not aligned with the original hypotheses. Study 5 aimed to replicate the design and procedure of Study 4, but this time focusing on a more diverse battery of tests that tap into other cognitive constructs under the 'baby brain' stereotype. Generally, these studies found a lack of stereotype threat and group effects across the tasks. Surprisingly, however, the results indicate that new mothers and pregnant women performed better than controls in the mathematics task.

The lack of significant stereotype threat effects in the results may be due to a number of factors, including important moderators (e.g., Shapiro, & Neuberg, 2007) and mediators (Pennington et al., 2016). Despite some work that considers how stereotype threat may be an appropriate framework to consider pregnancy-related behaviours (e.g., prevalence of workplace accidents in pregnancy; Lavaysse & Probst, 2020), this is the first study that assesses the capacity of stereotype threat to explain cognitive decline in pregnancy. It is also important to diversify the outcome variable of future stereotype threat work in this area. Immediate memory recall, as used in

these two experimental studies here, is only one of the various cognitive areas thought to be associated with cognitive decline in pregnancy and new motherhood (Davies et al., 2018).

Further, another explanation for the lack of stereotype threat effects may be that participants were all asked to comment on their memory ability in pregnancy prior to both the stereotype threat manipulation and the memory recall task. Responses to these free-text items were analysed in Chapter 3. This writing task could have primed participants to concentrate on or reflect upon their memory performance, which could weaken the strength of a threat manipulation and thus cancel out any observable differences in performance. In other words, the free-text box prompting participants to self-report their memory change could have served as a threat itself. Future research should thus aim to conceptually replicate this paradigm without priming memory ability in any way prior to the threat manipulation. Other areas for future study include more diverse outcome variables, such as attention and executive functioning, given that Davies et al. (2018) suggested that these capacities are also affected by pregnancy. Thus, more facets of 'cognitive ability' must be investigated fully in future studies.

The results of Study 4 result may also be due to the level of executive processing required to perform well in each of the three tasks used in this experimental work. As Onyper et al. (2010) suggest, in a study assessing executive functioning of pregnant women with matched controls, discrepancies in previous cognitive experiments may be because the measures that are used target different executive components. For example, the executive demands of the Flanker Task in this study, which requires

information to be retained during a distraction, are higher compared with the mathematics task, which may be answered with pre-potent and learned responding (Davies et al., 2016). As Hutter et al. (2019) explain, tasks which activate dominant and learned responses may lead to performance facilitation effects, despite the existence of a stereotype threat. For example, some 'horizontal math problems', such as the ones used in this work, activate a 'method of adjustment' prepotent response (Seitchik & Harkins, 2015). This reliance on a dominant, learned response can be useful for solving the problem effectively (Jamieson & Harkins, 2007). This may be why the mathematics task differed from the other tasks in terms of performance outcome in this study.

There are, however, some emerging group differences in cognitive ability, irrespective of stereotype threat condition (Study 4). To fully test the extent to which stereotype threat plays a role, there may be important situational and contextual factors that must be present in order to elicit stereotype threat effects. As Steele et al. (2002) explain, stereotype threat effects likely differ across testing contexts, due to the presence of different performance-relevant moderators and mediators. One potentially crucial factor, as many previous researchers have proposed, is the perceived *consequences* of test performance. For example, research has demonstrated that stereotype threat effects occur more prominently in 'high stakes' testing contexts (Fryer et al., 2008; McFarland et al., 2003; Sackett et al., 2004) Therefore, the lack of stereotype threat effects in the previous two studies may be due to the low stakes, and thus low motivation, nature of the testing contexts. If participants do not exert sufficient effort in the task at hand, or indeed are not sufficiently invested in the outcome of the task, and

therefore stressed at the threat of confirming the stereotype (Sherman et al., 2009), stereotype threatening information may likely not affect performance outcomes.

That is, regardless of whether 'baby brain' is a stereotype or a product of biological changes, in order for it to elicit stereotype threat effects, the notion of being stereotyped in this way should be sufficiently *threatening*. It is notable, therefore, that the vast majority of new mothers and pregnant participants self-reported cognitive changes throughout their pregnancy (Study 4) and self-reported a significantly higher awareness and endorsement of the 'baby brain' stereotype compared with non-pregnant participants (Study 5). This provides some important context to the stereotype threat testing paradigm. If the participants of these studies endorsed the 'baby brain' perception, this could mean that the threat of being perceived as conforming to the stereotype was not sufficiently activated, and thus stereotype threat effects did not occur. Similarly, these results may also simply demonstrate that baby brain performance stereotype threat does not impair pregnant women or new mother's cognitive ability, in light of the failed replication concerns of previous studies in this work (Flore & Wicherts, 2015).

As Jamieson and Harkins (2007) stress, stereotype threat occurs when *motivation* to disprove a negative stereotype outweighs ability to perform in the targeted domain. This 'mere effort' approach posits that stereotype threat increases performance motivation, by way of disproving a negative salient stereotype, which increases reliance on dominant *pre-potent* (i.e., dominant and learned; Jamieson & Harkins, 2007, 2009; McFall et al., 2009) responding. In other words, when under stereotype threat, the

goal to overcome the performance stereotype potentiates a well-learned and habitual response (Grandjean & Collette, 2011; McFall et al., 2009).

Therefore, if the performance measure is not conducive to reliance on pre-potent responding, participants under a stereotype threat underperform; if it is, this leads to performance facilitation effects (Davies et al., 2016; Hutter, et al., 2019).

5.5.1. Link to Chapter 6

On a final note, one simpler explanation for the null effects in this study may be the robustness of stereotype threat theory as a mechanism of explaining how stereotypes impact performance. These null effects may not be surprising, given the widespread concerns about stereotype threat theory's replicability and robustness (e.g., Flore & Wicherts, 2015; Stoet & Geary, 2012). Indeed, while there are undoubtedly various situational, theoretical, and contextual factors that should be further examined in the context of a 'baby brain' related stereotype threat, the present study also contributes to the ongoing questioning of stereotype threat theory's theoretical utility and methodological robustness. This work has reappraised stereotype threat theory, by investigating how it can provide insights into diverse types of stereotyping to different groups, namely the 'baby brain' stereotype. However, given the null effects, this may further question the validity of stereotype threat theory as a theoretical framework. It may also be helpful to look beyond the stereotype threat paradigm and focus on more replicable theories that relate social expectations to cognitive performance, such as objectification theory (Fredrickson & Roberts, 1997).

This work does not allow us to test fully whether the concept of 'baby brain' is a product of stereotyping alone. It does, however, allow us to begin to reassess how stereotyping may contribute to the perception of pregnant women and new mothers having 'baby brain' and question 'stereotype threat' as an explanation for this effect. Future work should extend enquiries investigating the utility of stereotype threat as an explanatory theory by focusing on other competing theories, including, for example, social comparison theory (e.g., see Chrisler et al., 2006). Similarly, there is now also scope to experimentally test other explanations for 'baby brain' effects, such as the role that objectification plays on cognitive functioning (Winn & Cornelius, 2020). Therefore, as noted in the Chapter 2, this thesis will now shift to a focus on objectification theory as an alternative account of the impact of stereotype salience on cognitive performance. Objectification theory shares underlying social mechanisms with stereotype threat theory, but has a stronger focus on how women's cognition may be influenced by the presence of gendered expectations. Given the evidence that suggests pregnant women face heightened objectification (e.g., Beech et al., 2020), this may be an appropriate framework for considering pregnancy-related cognition in a social context. This will extend enquiries into stereotype threat theory by offering an alternative theoretical account of how 'baby brain' narratives may harm, or alter, pregnant women's cognitive performance.

Chapter 6: Is objectification theory an explanation for ‘baby brain’?

6.1. Chapter Overview

Objectification theory has reliably demonstrated how body surveillance, self-objectification, and body shame can impede women’s cognitive performance in a range of different domains (Winn & Cornelius, 2020). Objectification manipulations serve to activate gender schemas, which interfere with quantitative performance on cognitive tasks. However, this research paradigm has not yet been applied as a potential explanation for the ‘baby brain’ stereotype related to pregnant women’s memory functioning. There are three empirical objectification studies in this chapter. Study 6 tested whether a sexual self-objectification manipulation (Calogero, 2013) can negatively impact pregnant women and new mothers’ memory functioning in a 2 (Condition: self-objectification vs. control) x 3 (Group: pregnant women vs new mother vs. female control) experimental design ($N = 450$). It was found that, while new mothers’ recall was lower than controls and pregnant women, self-objectification generally did not affect memory ability in the way that was hypothesised. Study 7 ($N = 192$) then aimed to conceptually replicate this effect with an amended pregnancy-related self-objectification manipulation, testing whether there is a difference between sexual vs pregnancy-specific objectification. This study, again, found no evidence for the hypothesised effects. Study 8 ($N = 288$) extended these findings and investigated whether an objectification manipulation impacted men and women’s *perceptions* of pregnant women. This vignette study found that a woman target was respected more when visibly pregnant versus when not pregnant, but only in the absence of an objectification

prompt. Taken together, these three studies assess whether self-objectification can partly explain the perceptions of 'reduced cognitive functioning' experienced by women throughout pregnancy and into new motherhood.

6.1. Introduction

"Pregnant women are widely thought to...not be able to think rationally and to frequently forget things. This is not to say that women 'really' do become more emotional, irrational and/or forgetful during pregnancy...but neither it is to say that it is just something that is said by or about pregnant women...Body image and material form [in pregnancy] are inseparable and mutually constituted."

(Longhurst, 2008, p. 30).

As the above quote from Longhurst (2008) demonstrates, and as the empirical data of Chapter 4 attests to, pregnancy is a time in which women's brains and bodies are regularly examined, monitored, and critiqued (Deighton-Smith., 2014). Therefore, consideration of women's brains during pregnancy (i.e., the 'baby brain' phenomenon) should also consider how women's *bodies* are responded to during this time. Research has consistently demonstrated that continual critical and objectifying gazes on women's bodies can interfere with cognitive functioning, as per the core tenets of Fredrickson and Roberts' (1997) Objectification Theory. Objectification theory broadly demonstrates how ubiquitous critical inspection of women's bodies has harmful and long-lasting consequences, such as disordered eating, habitual body monitoring, and negative body image. The performance deficit effect following induced body inspection, or

'state self-objectification' has been demonstrated in multiple groups of women and is a robust and well-evidenced phenomenon (see Winn & Cornelius, 2020 for a review). Further, as various scholars have noted, objectification theory may provide important insights into women's experiences throughout the transition to motherhood (Beech et al., 2020). Pregnancy is a time of heightened body concerns, including poorer body image and more regular experiences of body shaming (see Watson et al., 2015a). Moreover, tendency to self-objectify in pregnancy has been associated with other negative behaviours and attitudes throughout pregnancy and into new motherhood (e.g., Toledo & Cianelli, 2019).

However, while there is a paucity of research which demonstrates the impact of self-objectification on women's cognitive performance, to date, no studies have explicitly tested how objectification theory may explain cognitive changes in pregnancy. Specifically, no studies have tested whether state self-objectification serves to prompt women to perform in stereotypically consistent ways, such as conforming to the 'baby brain' stereotype of pregnant women and new mothers. In theory, as discussed in Chapter 2, this phenomenon could provide insights into the 'baby brain' effect. That is, if self-objectification reduces cognitive performance, and pregnancy is a time in which women's bodies are regularly critically appraised, this may explain why women underperform on memory tasks during this period. Therefore, it is proposed here that, beyond stereotype threat theory, self-objectification may account for differences in pregnant women's memory functioning. However, there is a notable lack of literature that directly tests this theory in the context of 'baby brain'.

To date, some empirical work has focused on self-objectification in the postpartum period, investigating factors such as the impact of self-objectification on breastfeeding behaviours (Al-Ali et al., 2013; Johnston-Robledo et al., 2007a, 2007b; Rodgers et al., 2018), and the dehumanising objectification of pregnant women (Morris et al., 2014). In a notable example of self-objectification studies within pregnancy *itself*, Rubin and Steinberg (2011) studied self-objectification in pregnant mothers and investigated whether body functionality appreciation buffers the negative impact of self-objectification in pregnancy. This effect was also recently replicated in a pregnant sample (Nolen et al., 2022). However, following a systematic review of motherhood and objectification research, Beech et al. (2020) concluded that while there is an emergent body of research which considers objectification of pregnant women and new mothers, there is a notable lack of research with pregnant women as participants. In response to this call for research, and in order to test a competing explanation for the ‘baby brain’ phenomenon, this chapter presents three empirical studies that each investigate objectification throughout pregnancy.

6.2. Study 6

In the first experimental study (Study 6), it was hypothesised that a self-objectification manipulation would have an *additive* interactive effect on pregnant women and new mother’s performance on a recall memory task. As per the fundamental tenets of objectification theory, it was predicted that all women participants, whether pregnant or not, would experience self-objectification effects and will have reduced recall following exposure to the manipulation (i.e., a main effect of self-objectification condition). However, given the evidence which suggests that self-objectification is heightened in

pregnancy (e.g., Nolen et al., 2022; Rubin & Steinberg, 2011), it was also predicted that pregnant women and new mothers would underperform compared with women who have not experienced pregnancy (i.e., a female control group) and the presence of a self-objectification manipulation would *exacerbate* these performance deficit effects between the groups. In other words, there would be a significant group by self-objectification condition interaction, such that pregnant women who self-objectify have worse memory performance compared with a) pregnant women who do not self-objectify, b) new mothers and controls who self-objectify. This would, therefore, directly test the impact of self-objectification as an explanation for the 'baby brain' performance effect.

6.2.1 Study 6 Method

6.2.1.1 Participants and design

This experimental study followed a 2 (objectification: self-objectification vs. control) x 3 (group: pregnant women vs. new mothers vs. control never-pregnant women) experimental between-groups design. An *a priori* sample size calculation using G*Power (Faul et al., 2007) showed that to reach 95% power and to obtain an effect size of $f = 0.20$ (based on the effect size reported by Gervais et al., 2011 in a similar experimental paradigm), when adopting an alpha of 0.05, the study would need a total sample size of 434 participants. Consider that Winn and Cornelius (2020, p. 10) note how the "omission of effect sizes further weakens the reliability" of the literature which assesses the impact of objectification on cognitive performance. Therefore, the sample size calculation here is based on the smallest significant effect size of interest reported in this systematic review. 568 participants were initially recruited, but the data of 118 participants were

removed for either failing the attention check (23 participants) or not completing the whole study (i.e., failing to complete the full study; 95 participants). After accounting for failed attention checks and attrition, participants were pregnant women ($N = 152$), new mothers ($N = 163$), and a never-pregnant female control condition ($N = 135$), leading to a total N of 450 participants.

Ethical approval was granted by the University of Leeds School of Psychology Ethics Committee on 20th August 2020 (Ref: PSYC-83). After removing incomplete and failed attached check data, the majority of participants in the final sample were recruited from Prolific Academic ($N = 423$), and the remainder were recruited on social media sites, including Twitter and closed parenting Facebook groups ($N = 27$). The mean age was 28.77 ($SD = 5.44$). The majority of participants were White British (64.6%), educated to a bachelor's degree level (72.3%) and in paid employment (75.1%). Participants who were recruited on Prolific Academic were paid the equivalent of £7.00 (\$9.70) per hour.

6.2.1.2. Procedure

All materials for this study are in Appendix D.

6.2.1.2.1. State self-objectification manipulation

To induce a state of self-objectification, participants completed a manipulation taken verbatim from Calogero's (2013) state self-objectification study. There has been a wide range of different self-objectification manipulations in the literature (e.g., see a review by Kahalon et al., 2018). For example, many studies use social context to elicit self-objectification, such as the presence of scales, mirrors, and male experimenters in the lab

(e.g., Tiggemann & Boundy, 2008) and others have exposed participants to subtle 'male gaze' primes (Gay & Castano, 2010). Calogero's (2013) manipulation was selected for this study given its applicability to online testing contexts and its explicit nature (as opposed to more subtle primes that may have weaker effects). Participants received the following instructions:

Please take a moment to think about a time when you felt that somebody was sexually objectifying you. For example, somebody was gazing at you or evaluating you in a sexualized way, making sexual comments about your body, or whistling at you on the street, etc. Think about what took place—where you were, who you were with, how you felt, what you were thinking, and write about your experience in the space below.

Participants were asked to write 'at least 50 words' and were prompted to write more by Qualtrics if they wrote less than 200 characters. Participants in the control condition were asked to take 50 words listing different colours.

6.2.1.3.2. Manipulation check

To check for a successful manipulation of state self-objectification, the 'surveillance' subscale of the Objectified Body Consciousness Scale-Surveillance (OBCS; McKinley & Hyde, 1996) was used. This scale is used in the literature to assess women's experiences of bodily awareness consistent predominantly with the theoretical view that objectification involves an externalized perception of one's body. Use of this scale as a proxy for a successful objectification manipulation echoed Moradi and Huang's (2008) notion that body surveillance is implicitly related to self-

objectification, as a behavioural manifestation of objectification. The OBSC surveillance subscale has been used extensively in the literature as a proxy measures of self-report self-objectification and has good validity (e.g., Calogero, 2011). The OBCS includes 8 items related to participants' concern for looks, which is measured on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale (e.g., “*during the day, I think about how I look many times*”). This mean created an overall index of self-objectification manipulation, which demonstrated good internal validity (Cronbach $\alpha = 0.80$).

6.2.1.3.3. Cognitive measures

Objectification theorists have stressed how cognitive tasks in self-objectification experiments should be aligned with negatively gendered performance, for performance deficit effects to occur. For example, the majority of experimental studies which investigate the effect of self-objectification on women's cognitive performance use dependent variables such as standardised calculus tests, quantitative reasoning, and mathematics (e.g., Kahalon et al., 2018; Winn & Cornelius, 2020) given the gendered stereotype that women are poorer at these tasks. Here, the present work is interested in whether state self-objectification increases self-body surveillance, activates gender schemas, which in turn harms cognitive performance and can partly explain the 'baby brain' phenomenon. For this test to get at the heart of 'baby brain', the cognitive test should closely align to the performance that this stereotype targets. Therefore, given that this study was interested in 'baby brain' effects, which typically relates to women's memory capacity (Davies et al., 2018), a memory task was implemented in this experiment.

In line with the empirical work of Chapter 5, two variants of a Verbal Word Learning Task (VWLT) were used as a dependent measure of cognitive ability, which was adapted from de Groot et al.'s (2006) study on pregnancy memory deficits. The first VWLT showed participants a list of 14 common monosyllabic shopping-list items (e.g., ham, eggs, bread, jam, rice). Each word was presented in isolation to participants in the middle of a white screen and were automatically replaced after two seconds. After viewing all 14 words, participants were asked to freely recall as many as they could in a text box using the computer keyboard (see Figure 6.1).

The second VWLT was adapted for the purpose of this study and aimed to a) replicate the first task, b) further delineate the emerging 'allocation of attention' hypothesis of 'baby brain'. That is, some have argued that another explanation of 'baby brain' is distinct 'cognitive reorganisation', such that pregnant women's attention becomes more attuned to pregnancy/baby related items (Anderson & Rutherford, 2012), which supposedly explains the deficits in memory and other cognitive processing. Therefore, this second task replicated the previous VWLT, but with unrelated monosyllabic 'baby related' unrelated word items (e.g., cot, wean, cute, cloth, soft). Additionally, this measure allowed comparison with the VWLT shopping list above, because shopping lists often consist of finite and thematically similar items, thus the unrelated nouns list acted a control for guessing on the VWLT shopping list. The experimental procedure was identical to the shopping list VWLT.

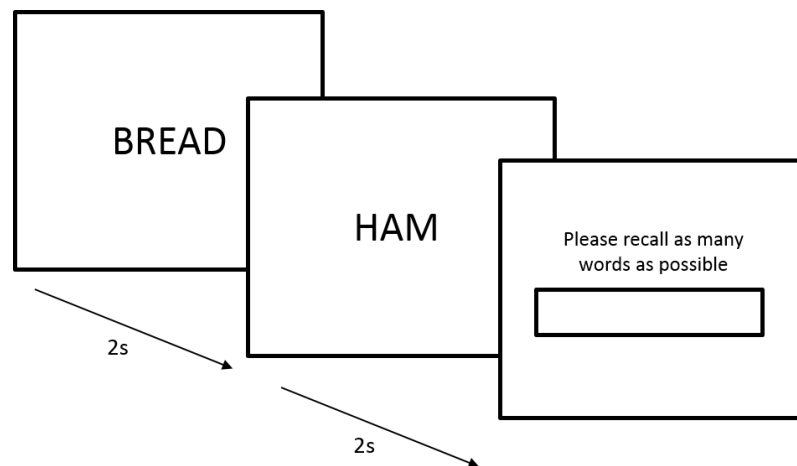


Figure 6.1. Verbal Word Learning Task Procedure.

6.2.2. Study 6 Results

Descriptive statistics are displayed in Table 6.1.

Table 6.1. Mean number of items correctly recalled on both Verbal Word Learning Tasks, split by experimental condition.

Group	Condition	VWLT1		VWLT2	
		M	SD	Mean	SD
Pregnant women	Self-objectification condition	8.71	1.95	7.85	2.24
	Control condition	8.11	2.28	7.68	2.54
New mothers	Self-objectification condition	8.08	2.63	7.55	2.63
	Control condition	7.80	2.22	7.56	2.22
Never-pregnant control	Self-objectification condition	8.76	1.95	7.50	2.16
	Control condition	8.75	2.05	7.87	2.03

6.2.2.1 Manipulation Check

We first tested whether the self-objectification manipulation had been successful in increasing body surveillance on the OBCS-S. An ANOVA

confirmed that those in the self-objectification condition later reported their levels of body surveillance significantly higher on the 'surveillance' subscale of the Objectified Body Consciousness Scale-Surveillance ($M = 3.95$, $SD = 0.82$) compared with the control condition who were asked to list colours ($M = 3.7$, $SD = 0.95$). This indicated a satisfactory self-objectification manipulation, $F(1,439) = 8.15$, $p = 0.005$, $\eta_p^2 = 0.018$.

6.2.2.2. Verbal Word Recall Task 1

To test the core hypothesis, a 2 (self-objectification vs control) x 3 (new mothers vs pregnant women vs control group) ANOVA with overall total recall on the first VWLT shopping list task was conducted. This showed a significant main effect of Group $F(2,441) = 5.12$, $p = 0.006$, $\eta_p^2 = 0.023$. Post-hoc tests with LSD corrections showed that, as expected, new mothers recalled significantly fewer words in this task ($M = 7.91$, $SD = 2.39$) compared with the control participants ($M = 8.76$, $SD = 1.99$), $p = 0.001$ [95% CIs -1.35, -0.35], but did not significantly differ from pregnant women ($M = 8.38$, $SD = 2.15$; $p = 0.06$), nor, interestingly, did pregnant women differ from controls ($p = 0.15$). Contrary to initial hypotheses, there was no significant main effect of Self-Objectification condition on recall, $F(1,441) = 1.97$, $p = 0.16$, nor was there a Group by Condition interaction, $F(2,441) = 0.65$, $p = 0.52$.

6.2.2.3. Verbal Word Recall Task 2

Participants overall performed better on the first Verbal Word Learning Task ($M = 8.311$, $SD = 2.21$) compared with the second task ($M = 7.66$, $SD = 2.3$), $t(449) = 6.31$, $p < 0.001$, which is likely due to order effects, as the tests were not counterbalanced. To test whether self-objectification or

group affected recall on the 'baby item' VWLT, a second 2x3 ANOVA was run, with total recall on the second Verbal Word Learning Task as the dependent variable. This analysis demonstrated no significant main effects of either Group, $F(2,441) = 0.331$, $p = 0.72$, or Condition, $F(1,441) = 0.104$, $p = 0.75$, nor was there a significant interaction, $F(2,441) = 0.5$, $p = 0.61$.

6.2.2.4. Self-reported memory

Contrary to other studies that demonstrate self-reported memory deficits (e.g., Henry & Rendell, 2007), the pregnant women in our sample generally did not self-report noticeable changes in their memory throughout their pregnancy. A chi-squared test of difference showed that pregnant women reported more mood changes (67.8% answered 'yes' to this item) compared with memory changes (35.5%); $\chi^2(1, N = 152) = 5.34$, $p = 0.02$. New mothers, in retrospect, also self-reported more mood changes throughout their pregnancy (81.6%) compared with memory changes (54.6%) but this was not significantly different $\chi^2(1, N = 163) = 0.31$, $p = 0.58$.

6.2.2.5. Stage of pregnancy as a factor

As an exploratory test, to investigate whether stage in pregnancy accounted for any recall differences across self-objectification, data from the pregnant participants was analysed with an exploratory 2 (self-objectification vs control) x 3 (trimester: first vs., second vs., third) ANOVA. It was reasoned that pregnant participants' whose pregnancy is more pronounced (i.e., they are more 'visibly' pregnant and further along in their pregnancy) may experience self-objectification in unique ways. This analysis revealed no significant main effect of self-objectification condition ($p = 0.28$), or

trimester ($p = 0.6$). However, there was a significant interaction between self-objectification condition*trimester with recall in VWLT1 as the dependent variable. Specifically, in the second trimester, there is a marked difference in recall on VWLT1 between self-objectification ($M = 9.1$, $SD = 1.90$) and no self-objectification participants ($M = 7.29$, $SD = 2.09$), with those in the self-objectification condition *outperforming* controls, which is contrary to expectations, $F(2,144) = 4.92$, $p = 0.009$, $\eta_p^2 = 0.064$ (see Figure 6.2). This interactive effect did not, however, replicate in VWLT2, $F(1,144) = 1.08$, $p = 0.30$, nor were there significant main effects of trimester ($p = 0.80$) or self-objectification ($p = 0.96$) in this task.

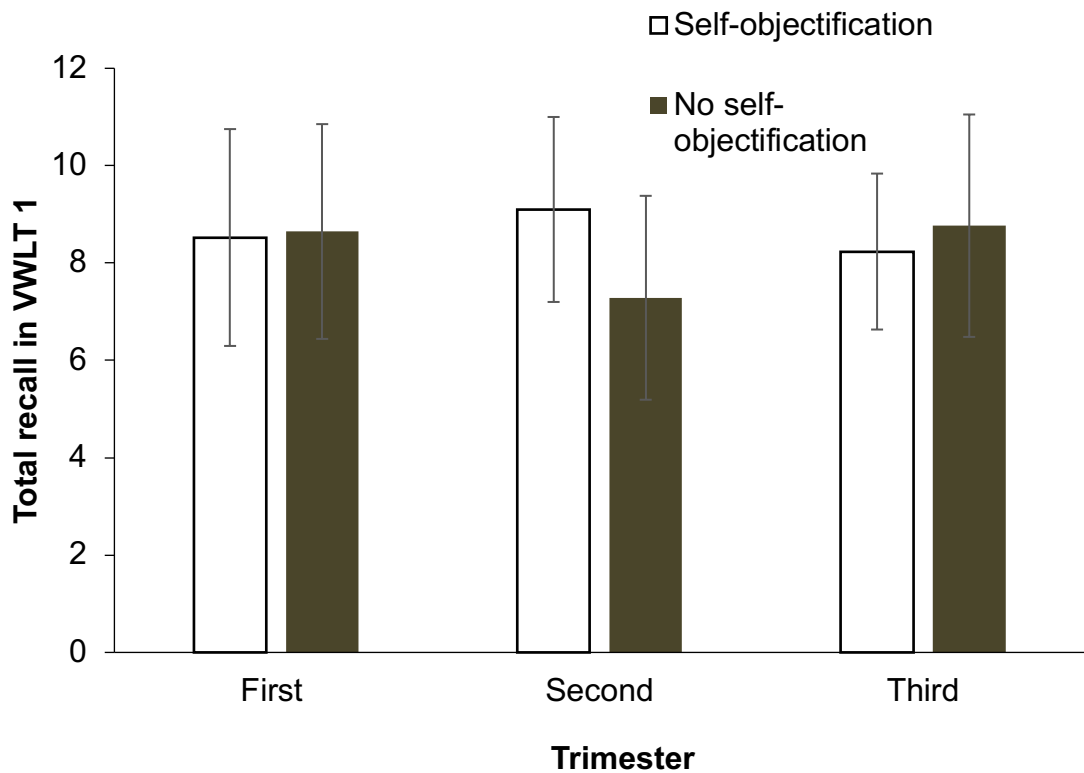


Figure 6.2. Effect of pregnancy trimester on total recall in VWLT1. Bars represent mean scores and errors bars are standard deviation.

6.2.3. Study 6 Discussion

Overall, this first objectification study tested whether an experimental self-objectification manipulation can impact pregnant women and new mothers' cognitive functioning, relative to a control group of women. There was no evidence to suggest that a self-objectification manipulation harmed women's memory performance, such that there also was not a main effect of self-objectification condition on recall. This is surprising, given how robust the phenomena of self-objectification and its impact on performance appears to be in the literature (Kahalon et al., 2018; Winn & Cornelius, 2020). There was also a significant main effect of Group, such that new mothers recalled significantly fewer words compared only with the control participants. Performance of pregnant women did not, however, significantly differ from controls or new mothers. These results may corroborate recent findings that suggest that mothers involved in childcare have notably lower cognitive performance than other groups owing to, for example, 'maternal duties' of new motherhood (Iwasa et al., 2021). Although, this result differs from Study 4 (Chapter 5), which found that pregnant women underperformed on a VWLT task, compared with new mothers and controls. While these results, therefore, are inconsistent, they do each support the notion that new mothers and pregnant women generally underperform compared with a never-pregnant group of control women.

Further, given the contradictions within the literature (Davies et al., 2018), more research is needed in this area to establish a more definitive conclusion, particularly given our finding that self-objectification *improved* performance for women in the second trimester of pregnancy. This may be tied to Rubin and Steinberg's (2011) finding that appreciation of body

functionality is a buffer against the negative ramifications of self-objectification, in that, while it was not measured or manipulated explicitly, participants in this trimester may have a heightened sense of appreciation of their body's functionality. If women in the second trimester are most chronically attuned to the function that their body is carrying out in pregnancy, this could protect against the self-objectification manipulation and thus improve performance in this domain. However, given that this finding did not replicate to the second VWLT, this conclusion should be extended to other research paradigms in order to be more supported. It was also found, contrary to predictions, that there was no difference in the memory ability of pregnant women and new mothers on a 'baby related' task (i.e., VWLT2) compared with generic items (VWLT1), compared with control participants. Further research should continue investigating how different memory tasks may affect performance, in light of this finding.

6.3. Study 7

Study 6 was the first experimental study that investigated whether a self-objectification manipulation may harm cognitive performance for pregnant women, in a way that might contribute to understanding 'baby brain' in pregnancy. One question which remains, however, is the extent to which *sexual* self-objectification is relevant for, or even aligned with, the kind of objectification that pregnant women may experience. Indeed, there has been much debate in the literature about whether pregnancy objectification is sexual, or whether pregnancy itself serves as a buffer to the negative effects of sexual objectification, and dehumanisation more broadly, because pregnancy it has an inherently 'humanising' function (see Morris et al., 2014). If the manipulation of sexual self-objectification was not appropriate

for objectification in pregnancy, because pregnancy objectification is rather a broader form of dehumanisation without a sexual component, then this may explain Study 6's null results.

Indeed, there has been some discussion surrounding whether objectification must be distinctly *sexual* in order to have negative consequences for performance (e.g., Szymanski et al., 2011). The extent to which objectification in pregnancy is sexual is also debatable; there are instances of clear sexualisation of pregnant women (Hopper & Aubrey, 2013), but objectification during this time tends to be more animalistic and dehumanising in focus (i.e., "literal" objectification; Morris et al., 2014)., Study 7 aimed to conceptually replicate the pregnancy condition of Study 6 with this under consideration, this time by including two types of self-objectification conditions: the sexual state objectification of Study 6, and an amended pregnancy-*specific* self-objectification manipulation (plus a control group, as before). This aimed to delineate whether self-objectification in pregnancy can harm performance if it is specifically relevant for the context of pregnancy, rather than associated with sexual objectification more broadly.

6.3.1 Study 7 Method

6.3.1.1 Participants and design

After removing 16 participants for incomplete or missing data, participants for Study 7 ($N = 192$) were all pregnant women, recruited from either social media parenting sites ($N = 45$) or Prolific Academic ($N = 147$). The mean age was 30.69 ($SD = 5.16$). 44.7% were experiencing their first pregnancy. Participants recruited on social media were entered into a prize

draw of £30 Amazon vouchers, in exchange for participation. Participants on Prolific Academic were paid £1.60 for participation. The study lasted for approximately ten minutes. 81.2% of participants were White British, and 86.3% were either married or living with a spouse. This study followed a between-subjects design. Ethical approval was obtained from the School of Psychology University of Leeds on 29th November 2021 (Reference: PSYC-390).

6.3.1.2. Procedure

6.3.1.2.1. Self-objectification manipulations

For Study 7, there were three experimental conditions: (1) the same state sexual self-objectification as Study 6 ($N = 60$), (2) a pregnancy-specific self-objectification condition ($N = 67$), (3) the same control no-objectification condition as Study 6 ($N = 65$). Participants were randomly assigned to receive one of the three conditions, using the ‘evenly present elements’ survey flow function in Qualtrics. In the pregnancy-specific self-objectification condition, participants received the following instructions, and participants in the state self-objectification condition will receive the same prompt as Study 6. Differences from the state self-objectification manipulation are in bold:

*“Please take a moment to think about a time when you felt that somebody was objectifying you **during your pregnancy**. For example, somebody was gazing at you or evaluating you, making comments **about your pregnant body, touching your bump, or providing unsolicited advice about your body while you were pregnant**. This could also be a time where you felt like people were*

*more interested **in your bump** than in you as a person. Think about what took place—where you were, who you were with, how you felt, what you were thinking, and write about your experiences **in pregnancy** in the space below.”*

Again, participants in the self-objectification condition were prompted to write ‘at least 50 words’ and were prompted by Qualtrics if they wrote less than 200 characters. Participants in the control condition were asked to take 50 words listing different colours.

6.3.1.2.2. Cognitive Measures

The cognitive measures for Study 7 were identical to Study 6, comprising of the same two Verbal Word Learning Tasks presented in the same way.

6.3.1.2.3. Manipulation check

As with Study 6, to check for a successful manipulation of state self-objectification, the ‘surveillance’ subscale of the Objectified Body Consciousness Scale-Surveillance (OBCS; McKinley & Hyde, 1996) was used. This scale had satisfactory internal consistency ($\alpha = .818$).

6.3.2. Study 7 Results

There were no differences on the body surveillance between conditions $F(3,190) = 0.245, p = 0.864$, which is discussed below. Participants recalled significantly more words on the VWLT1 task ($M = 8.44, SD = 2.08$) compared with VWLT2 ($M = 7.7, SD = 2.137$), $t(196) = 4.89, p < 0.001$. Contrary to hypotheses, a univariate analysis of variance (ANOVA) showed no significant difference between the three self-objectification

conditions on recall on the first memory task (VWLT), $F(2,192) = 0.123$, $p = 0.884$. Similarly, there was no significant effect of Condition on recall on the second memory task (VWLT2), $F(2,192) = 0.042$, $p = 0.959$.

6.3.2.1. Stage of pregnancy as a factor

As an exploratory test, to investigate whether stage in pregnancy accounted for any recall differences, a 3 (Condition: sexual self-objectification vs pregnancy objectification vs control) x 3 (Trimester: first vs., second vs., third) ANOVA was run. While there was no significant main effect of condition ($p = 0.093$) and stage of pregnancy ($p = 0.227$), as with Study 6, there was again a significant interaction between self-objectification condition*trimester on VWLT1 recall, $F(4,192) = 3.6$, $p = 0.008$, $\eta_p^2 = 0.073$. Post-hoc tests showed that differences were accounted for in the first trimester only; that is, in the first trimester, participants who received a sexual self-objectification manipulation performed significantly better ($M = 10.714$, $SD = 2.29$) than the control group ($M = 7.46$, $SD = 1.5$), $p < 0.001$ [95% CIs, 1.379, 5.126]. Similarly, in the first trimester, participants who received a *pregnancy* self-objectification also showed significantly higher recall ($M = 9.00$, $SD = 1.88$) compared with controls ($M = 7.46$, $SD = 1.5$), $p = 0.05$, [95% CIs -0.001, 3.078]. This interactive effect did not, however, replicate in VWLT2, where there were no significant main or interactive effects.

6.3.3. Study 7 Discussion

Taken together, Studies 6 and 7 raise some important questions regarding self-objectification in pregnancy and the ties to cognitive performance. Generally, results were not aligned with expectations. In

particular, the notion that neither a state sexual self-objectification nor a pregnancy-specific self-objectification manipulation affected body consciousness scores in Study 7 was unexpected. Across the studies, pregnant women had relatively comparable body consciousness scores irrespective of condition (Study 6 $M = 3.93$; Study 7 $M = 3.65$). Therefore, this finding may be explained by differences in the samples of both studies or the smaller sample size of Study 7. Similarly, some of the effects found in Study 6 did not replicate in Study 7, despite the same measures being used. For example, in Study 6, pregnant women in the *second* trimester had improved memory when in the self-objectification condition, whereas in Study 7 this effect was found for women in the first trimester. More generally, the notion of self-objectification *improving* performance in both studies was not aligned with expectations. Adopting a stereotype threat approach to explain this finding, it may be that participants were able to adopt habitual, well-learned responses to solving the memory task. Indeed, as per the mere effort approach of stereotype threat (see Chapter 2), performance is energised (i.e., improved) when task success is conducive to habitual, pre-potent responses (e.g., Jamieson & Harkins, 2007, 2009). Therefore, this effect could provide evidence for a mere effort effect in pregnant women's memory performance, when a self-objectification manipulation acts as a stereotype threat.

Further, a second theory explaining the null self-objectification results may be that the manipulations used in Study 7 did not make *gendered* expectations of participants' performance salient, which is another proposed mechanism for the performance deficit effect (see Kahalon et al., 2018). That is, recalling experiences of sexual self-objectification during pregnancy

did not prompt participants to elicit feelings that then lead to underperformance in a stereotyped task, because the manipulation was not explicitly connected to the task itself. A methodological improvement may be, for example, adopting an outcome variable that is more explicitly tied to gendered expectations. In other words, if participants did not connect the Verbal Word Learning Tasks to gendered expectations about pregnant women's abilities, and indeed the 'baby brain' phenomenon itself, this may have undermined the strength of the self-objectification manipulation.

There are a number of methodological considerations that may partly explain these results. For example, the study did not measure or control for participants' perception of their body image, internalisation of traditional gender norms, or body functionality or appreciation, which may be important factors (Quinn et al., 2011; Tiggemann & Boundy, 2008). Future research should further explore this potential link, given how factors such as stressing body *functionality* over aesthetics has been thought to protect against self-objectification in pregnancy (Rubin & Steinberg, 2011). As other scholars have also noted in self-objectification work, body shame, internalization of appearance ideals, and body appreciation in women are all linked to objectification (e.g., see qualitative work by Deighton-Smith & Bell, 2018), and these factors are uniquely negotiated in motherhood. For example, Yager et al. (2020) found that women with children had higher levels of body shame than those who did not; therefore, body shame may be an important moderating factor in our study. Similarly, the pathway between body surveillance and disordered eating has found to be exacerbated by body shame and attenuated by body functionality appreciation. Donati Beech et al. (2020) found that this pathway existed specifically for mothers who were

breastfeeding. Alternatively, another reason why the study may not have seen a self-objectification*group interaction, could be because there was not a 'true control' in Study 6. For example, other studies have used male participants as a control group, given the evidence that men do not experience the impact of objectification to the same extent as women (Heflick et al., 2011). Although, regardless of this, it could be argued that the study would still logically expect to find a main effect of self-objectification condition in Study 6 and Study 7.

One alternative explanation for these null results may be the difference between state (i.e., situational) versus trait (i.e., chronic) self-objectification (Calogero, 2013). Trait self-objectification refers to a chronic, omnipresent tendency to self-objectify, rather than a contextual response to an objectification manipulation or trigger. It may be argued that pregnant women face ongoing self-objectification throughout their pregnancy, which means that a trait self-objectification measure is more appropriate than a state self-objectification manipulation. Future research should now unpack the difference between these constructs in the context of pregnancy.

Finally, it is also worth noting that there have been recent failed replication attempts of the core tenets of objectification theory in the literature. For example, De Wilde et al. (2020) reported two preregistered direct replications and found that, contrary to the findings in Calogero's (2013) original study, an objectification manipulation did not impact likelihood to protest sexism. The authors' explain that these replication attempts were conducted on the basis of four unpublished studies that found null effects in the context of self-objectification and system justification

theory. The failed replication should not be applied proscriptively to the future of objectification research (particularly given the body of literature which demonstrates the utility of the theory; Kahalon et al., 2018), because science requires wealth of evidence to determine the robustness or a particular theory (Open Science Collaboration, 2015). However, this does prompt an appraisal of the contexts which may find objectification effects. Given the null results here on research that investigates pregnant women's *performance* in the context of *self*-objectification, it is now useful to assess how the tenets of objectification theory can explain *perceptions* of pregnant women.

6.4. Study 8

In Study 6, the impact of a self-objectification manipulation on pregnant women and new mothers' memory performance was investigated. Study 7 then aimed to conceptually replicate this, testing whether objectification in pregnancy is aligned with sexual objectification or not. These experimental studies echoed the literature which demonstrates the impact of objectification of women's self-perceptions and performance (e.g., Chevallereau et al., 2021; Guizzo & Cadinu, 2017). It was predicted that inducing a state of self-objectification would harm performance, by activating gender schemas that position pregnant women and new mothers as cognitively less able, as per the 'baby brain' stereotype. However, as discussed, this study did not find the effects that were hypothesised; that is, pregnant women and new mothers were not affected negatively by the self-objectification manipulation.

However, there is also a body of research that shows the impact of objectification on observer's *perceptions* of women (Heflick et al., 2011). For example, in Heflick et al.'s (2011) study, which provides much theoretical rationale to the present study, across three experimental studies it was found that objectified women were rated to be less competent and warm compared with a) men and b) women who were not objectified. This series of studies demonstrated how prompting participants to objectify women (by asking that participants focus on a targets' appearance) led to decreased ratings of the targets' competence, warmth, and moral status. This was tested using videoclips of male and female news anchors (Study 6) and the U.S. President and First Lady (Study 2; Study 3). These studies concluded that women, but not men, were rated more harshly following appearance focus.

A similar pattern of results has been found in other studies. For example, an objectification manipulation, where participants are instructed to focus on appearance, has been related to outcomes in different contexts, such as, negative evaluations of students (Cabras et al., 2018), dehumanisation of Black women (Anderson et al., 2018), more negative assessments of politicians' credibility (Funk & Coker, 2016), denial of moral concern (Loughnan et al., 2010), and decreased perceptions of warmth and competence (Loughnan et al., 2017). These findings have been explained by the notion that objectification is related to (literal) dehumanisation of people, which reduces their traits and attributes that are associated with humanness, such as morality, warmth, and competence (Heflick & Goldenberg, 2009; Loughnan et al., 2010; Vaes et al., 2011). In light of this, therefore, the focus of this thesis will now shift from the impact of *self-*

objectification on pregnant women's performance, and instead focus on how the core tenets of objectification theory may explain *perceptions* of pregnant women's competence and cognitive functioning. There is a plethora of literature which demonstrates how the objectified tend to be perceived as lacking in warmth, competence, and are perceived to be 'lacking mind by others' (Heflick et al., 2011). There is also a body of literature which demonstrates how respect and liking are related to perceptions of warmth, competence, and morality (e.g., see Prestwich et al., 2021).

In theory, the notion that objectification harms *perceptions* of women may be useful in explaining the 'baby brain' stereotype, as this could provide an explanation for how pregnant women's cognitive performance is judged, and thus regulated, by other people. It is important to assess how objectification impacts perceptions of women throughout pregnancy, given the potential link with maternity discrimination and negative attitudes towards women in their pregnancy, which can have knock-on effects to women's maternal health (Hackney et al., 2020). Here, it was predicted that the condition in which participants' rate a pregnant woman and non-pregnant woman will show significantly more negative perceptions of competence, compared with men, and this will be further compounded by an objectification manipulation. It was also predicted that objectification will lead to decreased liking and respect of the target. In line with the view of objectification as a construct that relates to the anticipation of a 'male gaze' (Calogero, 2004), it was also predicted that male observers (i.e., male participants) will show heightened impact of objectification, compared with women observers.

6.4.1 Study 8 Method

6.4.1.1. Participants and design

This study was conceptual replication and extension of Heflick et al. (2011). 288 participants were recruited from Prolific using custom pre-screening was used to recruit U.S. based participants (after removing 5 participants for failed attention checks – see Materials). The gender split was exactly 50/50. Seven participants were not included in the final dataset for answering either ‘prefer not to say’ or ‘non-binary’ to the gender question, due to the research design. The mean age was 29.64 ($SD = 8.76$). 75.3% of participants were White and 59.40% were parents. Participants were paid the equivalent of £6.00 per hour via Prolific. The only exclusion criterion was that participants should not be currently pregnant at the time of participation, so as not to skew perceptions. This experiment followed a between-subjects design, with a 2 (observer: man vs woman) x 2 (target: pregnant woman vs not pregnant woman) x 2 (condition: objectification vs no objectification) between-subjects design. All materials were presented to participants online via an experiment built in Qualtrics. Ethical approval for this study was granted by the University of Leeds School of Psychology Ethics Committee on 8th April 2021 (Reference: PSYC-247). Materials for this study can be found in Appendix F.

6.4.1.2. Materials

As per Heflick et al. (2011), participants watched and rated a video clips of the targets. In our study, in order to maintain a level of standardisation across the pregnant vs non-pregnant conditions, two video clips of a female UK television personality from a popular UK word-based puzzle television show was used. In one condition, the presenter is visibly

pregnant (pregnancy condition) and the other condition shows the same presenter not pregnant (no pregnancy control condition). This strengthens the methodology, because it limits the number of target confounds (e.g., physical appearance, Heflick & Goldenberg, 2009), that have been found to affect perceptions of competence, warmth, and morality.

Participants watched clips of the same presenter on the show while visibly pregnant versus not pregnant (see Figure 6.3 for still of both video materials). Both clips were edited to last for 1.5 minutes, as per Heflick et al. (2011). Participants were able to watch the videos full screen on mobile or desktop. The UK gameshow is not aired in the US; therefore, it was reasoned that participants based in the US were unlikely to have prior perceptions or knowledge of the show or the target which could also confound our results. The target was also approximately average sized, which is important given how deviations from average body size affects person perception dimensions (see Bryksina et al., 2021). These materials also differ from Heflick et al. (2011), because they are not tied to any political orientation, which may also potentially confound the results.



Figure 6.3. Static stimuli from Study 6 video materials, pregnancy condition (L) and non-pregnancy condition (R).

6.4.1.2.1. Appearance focus

In the objectification condition, participants were told “*You are about to view a short clip of woman on a television programme. Please focus on her **physical appearance** and the way her body looks in the clip.*” In the no-objectification control condition, “physical appearance” was replaced with “*performance (i.e., her ability to do her job)*”. In both conditions, participants were asked to confirm via a radio button that they ‘understand what they have to focus on’ before viewing the videos.

6.4.1.2.2. Perceptions of competence

To assess perceptions of the targets’ competence, participants were then asked to rate the targets on traits aligned with competence (intelligent, capable, smart) on a 7-point Likert scale (1—*not at all descriptive*, 7—*entirely descriptive*), again, as per Heflick et al. (2011, Study 2). As an attention check, participants were asked to ‘please select ‘3’ for this question so we know you are paying attention’ (see Gummer et al., 2021). This also included the question ‘how well do you think the woman in the clip performed at her job?’ (1 – *very badly*, 5 – *very well*). These items were averaged to create an index of competence perceptions. Cronbach alpha for the questionnaire was satisfactory ($\alpha = 0.730$).

6.4.1.2.3. Perceptions of warmth

To assess perceptions of the targets’ warmth, participants were then asked to rate the targets on traits aligned with warmth (warm, caring, kind) on the same 7-point Likert scale (1—*not at all descriptive*, 7—*entirely descriptive*), again, as per Heflick et al. (2011, Study 2). Cronbach alpha for the index of these three items was satisfactory ($\alpha = 0.876$).

6.4.1.2.4. Familiarity with the target

Participants were also asked to rate how familiar they were with the target prior to the study, again on a 7-point scale (1—*not familiar at all*, 5—*extremely familiar*). This was included to assure that any differences in competence perceptions are not due to familiarity with the target, which could impact the objectifying effects of appearance focus (Heflick et al., 2011; Study 3).

6.4.1.2.5. Liking and respect

To measure liking and respect, there were two items “I [like/respect] the woman in the video clip”, which were each measured on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

6.4.1.2.6. Manipulation checks

To check for the objectification manipulation, participants were lastly asked to self-report whether, when watching the video, they mostly focused on ‘appearance’ or ‘performance’.

6.4.2. Study 8 Results

Table 6.2 shows intervariable correlations. Note that all variables were significantly positively correlated with one another. Table 6.3. shows descriptive statistics.

Table 6.2. Study 8 intervariable correlation matrix

	1	2	3
1. Liking	--		
2. Respect	.539**	--	
3. Warmth	.447**	.244**	--
4. Competence	.390**	.413**	.420**

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Table 6.3. Descriptive statistics for the four dependent variables by 2x2x2 conditions

Gender	Condition	Target	Liking		Respect		Comp.		Warmth	
			M	SD	M	SD	M	SD	M	SD
Men	Object.	Pregnant	5.86	1.00	6.11	0.80	5.25	1.23	5.22	0.89
		Control	5.89	0.80	6.17	0.79	5.23	1.04	5.04	0.86
		Total	5.87	0.90	6.14	0.79	5.24	1.13	5.13	0.88
	No object.	Pregnant	5.58	0.99	6.03	0.80	5.15	0.89	5.01	0.67
		Control	5.29	1.45	5.73	1.00	4.95	1.24	5.05	1.28
		Total	5.42	1.28	5.86	0.92	5.04	1.10	5.03	1.05
	Total	Pregnant	5.73	1.00	6.08	0.79	5.20	1.08	5.12	0.79
		Control	5.57	1.23	5.93	0.93	5.08	1.15	5.05	1.10
	Women	Object.	Pregnant	5.40	0.96	5.93	0.96	4.89	1.20	5.19
Control			5.53	1.01	6.17	0.79	4.68	1.15	5.09	0.89
Total			5.45	0.97	6.03	0.90	4.80	1.18	5.15	0.90
No object.		Pregnant	5.45	1.06	6.10	0.87	4.71	1.40	5.35	1.04
		Control	4.95	1.18	5.49	1.19	4.54	1.33	5.05	0.79
		Total	5.18	1.15	5.76	1.09	4.62	1.36	5.19	0.92
Total		Pregnant	5.42	0.99	6.00	0.92	4.82	1.28	5.26	0.97
		Control	5.21	1.14	5.79	1.08	4.60	1.25	5.07	0.83
Total		Object.	Pregnant	5.60	1.00	6.01	0.89	5.05	1.22	5.20
	Control		5.72	0.91	6.17	0.78	4.97	1.12	5.06	0.87
	Total		5.66	0.96	6.08	0.84	5.02	1.17	5.14	0.89
	No object.	Pregnant	5.52	1.02	6.06	0.83	4.93	1.19	5.18	0.88
		Control	5.13	1.33	5.62	1.10	4.76	1.29	5.05	1.07
		Total	5.30	1.22	5.81	1.01	4.83	1.24	5.11	0.99
	Total	Pregnant	5.56	1.01	6.04	0.86	5.00	1.20	5.19	0.89
		Control	5.40	1.19	5.87	1.00	4.86	1.22	5.06	0.98

6.4.2.1. Manipulation check

Firstly, as a manipulation check, a chi-squared was run, to investigate whether participants who were asked to focus on appearance then later reported that they did focus predominantly on the target's appearance, and vice versa for performance focus. This revealed a satisfactory manipulation check $\chi^2(1, N = 288) = 91.948, p < 0.001$. Similarly, second chi-squared test was run to test whether participants in the pregnant woman condition later

successfully reported this (by way of answering 'yes' to the 'was the woman in the video pregnant?') item. This analysis too confirmed that the manipulation check was successful, $X^2(1, N = 288) = 253.74, p < 0.001$. Finally, 71.9% ($N = 207$) of all participants reported that they were 'not familiar at all' with the target, so this variable was dropped from further analyses and familiarity was ruled out as a confounding variable.

6.2.2.2. Main analyses

To test the core hypothesis, 2 (observer: man vs woman) x 2 (target: pregnant woman vs not pregnant woman) x 2 (condition: objectification vs no objectification) MANOVA with all dependent variables (competence, warmth, liking, and respect) was conducted. A MANOVA, rather than multiple ANOVAs, was deemed appropriate, given how strongly the dependent variables were correlated. This MANOVA revealed a significant main effect of objectification Condition $F(4,272) = 2.658, p = 0.033$; Wilk's $\Lambda = 0.962, \eta^2 = .038$. There was also a significant main effect of observer Gender $F(4,272) = 4.739, p = 0.001$; Wilk's $\Lambda = 0.935, \eta^2 = 0.065$, but no significant main effect of pregnancy condition ($p = 0.603$). There was a significant interaction between objectification condition*pregnancy condition, $F(4,272) = 2.462, p = 0.046$; Wilk's $\Lambda = 0.965, \eta^2 = 0.035$, but no other significant interactions.

The main effect of objectification condition across the four dependent variables was investigated. This showed that objectification condition only impacted respect and liking scores, such that the objectification led to increased liking ($M = 5.66, SD = 0.958$) compared with no objectification ($M = 5.3, SD = 1.22$), $F(1,275) = 7.314, p = 0.007$. Objectification also led to

greater respect for the target ($M = 6.08$, $SD = 0.843$) compared with no objectification ($M = 5.81$, $SD = 1.01$), $F(1,275) = 5.522$, $p = 0.019$. Neither warmth ($p = 0.228$) nor competence ($p = 0.877$) were impacted by objectification.

We then investigated the main effect of participant gender across the four dependent variables. This showed that participant gender was associated with differences in liking scores $F(1,275) = 6.203$, $p = 0.013$, $\eta^2 = 0.022$, such that men liked the woman in the video more ($M = 5.64$, $SD = 1.126$) than women ($M = 5.32$, $SD = 1.064$). Respect did not differ by gender ($p = 0.402$). There was a significant gender difference in warmth scores $F(1,275) = 9.267$, $p = 0.003$, $\eta^2 = 0.33$, but not competence ($p = 0.427$). Men rated the woman in the video across conditions as warmer ($M = 5.136$, $SD = 1.12$) than women did ($M = 4.72$, $SD = 1.27$).

Finally, the significant objectification*pregnancy interaction in the MANOVA was investigated with univariate analyses. This showed that only respect scores were significantly impacted by the interaction $F(1,275) = 7.473$, $p = 0.007$, $\eta^2 = 0.026$. Liking scores ($p = 0.065$) and perceptions of both warmth ($p = 0.813$) and competence ($p = 0.966$) were not impacted significantly by the interaction. Pairwise comparisons then showed that, in the no-objectification condition, the target was respected more when she was pregnant ($M = 6.06$, $SD = 0.827$) versus when she was not pregnant ($M = 5.62$, $SD = 1.096$), $p < 0.001$, 95% CI [0.255, 0.865], but this effect did not occur in the objectification condition ($p = 0.788$). Across pregnancy conditions, objectification also led to higher respect ($M = 6.08$, $SD = 0.843$) compared with no objectification ($M = 5.81$, $SD = 1.008$).

Similarly, liking scores were significantly impacted by objectification condition regardless of pregnancy condition $F(1,275) = 7.314, p = 0.007, \eta^2 = 0.026$, such that objectification led to more liking ($M = 5.66, SD = 0.958$) compared with no objectification ($M = 5.30, SD = 1.216$) across conditions.

6.4.3. Study 8 Discussion

Overall, this experiment aimed to test whether objectification harms perceptions of pregnant women in a way that is different from the wider objectification of women, on ratings of warmth, competence, respect and liking. It was theorised that pregnant women would be more negatively evaluated when objectified, due to the plethora of literature which demonstrates how objectification prompts people to be viewed as less human and more object-like. It was expected that objectification of pregnant women would be a heightened form of objectification of other groups of women, and would show markedly different impact on competence ratings, respect, and liking. While there was evidence that objectification led to increased respect and liking, the interaction suggests that objectification may also 'cancel out' the impact that pregnancy has on respect ratings. That is, the target was respected more when she was pregnant, compared to not pregnant, but only when observers focused on her performance. When appearance focus was manipulated, there were no differences in respect ratings. There were also no significant differences, other than gender of the observer differences, in perceptions of the target's warmth or competence. That is, warmth and competence ratings were not impacted by either the objectification manipulation or by pregnancy condition, which is not consistent with objectification theory. These findings were largely

inconsistent with our expectations, but raise important questions about the extent to which appearance focus in pregnancy constitutes objectification (Donati Beech et al., 2020; Rubin & Steinberg, 2011).

This study found that objectification (i.e., appearance focus) led to *increased* respect and liking for the target, irrespective of pregnancy condition. However, the results of the interaction also suggest that objectification can improve respect and liking for non-pregnant women for both men and women observers to a greater extent than for pregnant women. There were no differences, other than gender of the observer differences, in perceptions of the target's warmth or competence as a function of objectification or pregnancy. These findings are generally counter to predictions, in that the literature suggests that objectification leads to dehumanisation, which is associated with lower respect, liking, and more negative perceptions of warmth and competence. While this is not aligned with hypotheses, the increased liking and respect result may be because objectification prompts gender schema activation towards the target, which may trigger paternalistic responses such as the 'women are wonderful' effect (e.g., see; Eagly & Mladinic, 1989; Eckes, 2002; Haddock & Zanna, 1994). That is, objectification triggers reminders of gender, which prompts a more positive appraisal of liking and respect given how women are regularly stereotyped to be likeable and amenable (e.g., Kahalon et al., 2018). Similarly, this finding may also corroborate Gray et al. (2011), who make a distinction between perceptions of 'agency' and 'experience' following an objectification manipulation. Gray et al. (2011, Experiments 5 and 6) found that objectification prompts people to view targets as more sensitive to harm and decreases perceptions of their agency.

However, this literature does not explain how warmth and competence were not impacted by a) objectification condition, b) pregnancy condition. The latter of these null results is particularly surprising, given how objectification has been found to impact these dimensions (e.g., Heflick et al., 2011). One explanation may be the context of the videos. In the stimuli, the target is seen talking and placing letters on a board (as part of a gameshow). This may constitute a 'workplace', a context in which objectification and perceptions of warmth and competence may look different. For example, Belmi and Schroeder (2021) showed that objectification is *more* prevalent in workplace contexts and when events are framed as work-related. Gray et al, (2011, Experiment 2) also found that evaluating targets based on professionalism, rather than attractiveness, leads to a *decreased* focus on the body. Therefore, in Study 8, the target's perceived professionalism, or indeed the contextual factors which signal professionalism, may have buffered the negative effects of body focus that would be expected.

Similarly, pregnant women were respected more when participants focused on her performance, which may also be explained by the notion that pregnant women must be 'supermum' during the transition to pregnancy (Choi et al., 2005). That is, during pregnancy women must 'have it all' and be able to perform well at home and at work. In the video stimuli, given that the pregnant woman was seen to be performing 'well' and matching this gendered expectation, this could explain heightened respect ratings. Appearance focus thus then disrupted this perception and cancelled out the impact that pregnancy has on respect. This finding may also partly corroborate Gray et al. (2011), who make a distinction between perceptions

of 'agency' and 'experience' following an objectification manipulation. Gray et al. (2011, Experiments 5 and 6) found that objectification prompts people to view targets as more sensitive to harm and decreases perceptions of their agency. Further research should now further investigate the issue of respect during pregnancy, as this seems to be a key driver of perceptions in the present study. Given how perceived respect is linked to sexism and discrimination (Jackson et al., 2001), this research turn to investigate how respect towards pregnant women may impact experiences of objectification.

Generally, this study attempted to investigate whether objectification of pregnant women is fundamentally different to the objectification of non-pregnant women. The notion that objectification may 'cancel out' the impact that pregnancy has on respect ratings should now be subject to further study. For example, future work may now wish to focus on how respect towards pregnant women may differ by participants' endorsement of gender norms, benevolent sexism towards pregnant women, and experiences of pregnancy (e.g., Sutton et al., 2011).

6.5. Chapter 6 Discussion

Overall, the three studies in this chapter aimed to investigate whether 'baby brain'-related performance and perceptions may be explained by (self) objectification theory. Studies 6 and 7 focused on the impact that self-objectification may have on memory performance in pregnancy, and Study 8 then assessed whether objectification impacts perceptions of women in their pregnancy. These studies each explore the claims made by objectification theorists, by applying the core tents of objectification theory to the understudied population of pregnant women. Generally, despite theoretical

compatibility with objectification theory and the 'baby brain' concept, it does not appear that self-objectification (at least, in an experimental setting) may account for tangible differences in pregnant women's memory performance. As with Chapter 5, these findings raise important questions about the utility of objectification theory in explaining 'real world' cognitive performance, the implications of which are discussed at length in Chapter 7.

Finally, there are some notable limitations to the samples of this research. For example, the two self-objectification studies recruited predominantly White women (64% and 81.2%, respectively), which means that the generalisability is limited. Research has demonstrated how Black women experience the effects of self-objectification in unique ways, due to the sexualisation and dehumanisation of Black people (Anderson et al., 2018). This, coupled with the research which shows how Black women experience higher levels of objectification compared with other groups (Watson et al., 2015b), means that future research should look further at how self-objectification impacts cognitive functioning in pregnancy by utilising a more intersectional lens.

Chapter 7: General discussion

7.1. Contribution of the thesis

Overall, the eight empirical studies of this thesis have addressed the concept of 'baby brain' in pregnancy through a social psychological perspective. 'Baby brain' is the notion that women have reduced cognitive abilities, particularly memory functioning, in their pregnancy and into the immediate postpartum period (Brett & Baxendale, 2001). This work generally aimed to respond to lack of consistency and clarity within the neurological, biological, and cognitive literature which investigates 'baby brain' in pregnancy, by offering an alternative social account of this phenomenon. Indeed, in recent years, scholars have voiced concerns about objective investigations into 'baby brain', noting issues such as inconsistencies in data collection methods across studies (Luders et al., 2020), challenges in capturing 'real world' cognitive multitasking in parenthood (Ablow & Measelle, 2019), and lack of ecological validity in neuroimaging studies of maternal brains (Laurent, 2019). As the review in Chapter 2 demonstrated, this literature is also littered with inconsistencies; most notably, some studies report large differences when comparing pregnant women's memory performance with other groups, and some find no difference (see Davies et al., 2018 meta-analysis).

Some scholars have also critiqued the objective cognitive 'baby brain' literature for perpetuating unhelpful narratives of women as irrational and forgetful, which deflect attention from women's lived experience and disregard social context (e.g., Longhurst, 2008). As Hurt (2011, p. 391) summarises, because "baby brain is discursively construed as a legitimate

condition [in the scientific literature], it holds the potential to convince women they have lost mental ability”. Therefore, the work in this thesis broadly aimed to offer an alternative account of ‘baby brain’ in pregnancy, by focusing on theories from the social psychological literature. This work thus aimed to expand understanding of the ‘baby brain’ phenomenon, by investigating women’s self-reported experiences (Chapter 3), identifying the contents of pregnancy stereotypes (Chapter 4), and testing the extent to which a stereotype threat and self-objectification manipulation may exacerbate deficits in memory performance of pregnant women.

Overall, the body of work presented here has examined how pregnant women and women in the immediate postpartum period may be subject to stereotyping about their cognitive abilities, as per the notion of ‘baby brain’. This research has extended two core theories within social psychology: stereotype threat theory and objectification theory. These investigations are important, because ‘baby brain’ has been thought to feed into discrimination towards pregnant women (e.g., Longhurst, 1999, 2008). Moreover, given how ‘baby brain’ is a cultural phenomenon, or “cultural artifact” as Hurt (2011), the notion that pregnant women are cognitively less able, more forgetful, and less attentive during pregnancy may contribute to the proliferation of gendered stereotypes. This perception ultimately serves to restrict women’s participation in certain spheres (e.g., Fiske., 2018; Fiske et al., 1999).

All studies in this thesis derive from social psychological literature and theory, calling into question how social phenomena, such as stereotypes and objectification, may influence women’s actual, observable cognitive

performance in their pregnancy. As discussed in Chapter 2, the study of 'baby brain' lends itself well to consideration through a lens of social cognition, because it represents a period of time in which both women's brains and bodies are subject to uniquely high levels of inspection, suspicion, and judgement. As Longhurst (2008) argues, the 'baby brain' discourse is particularly problematic for women in the workplace because "workers are usually expected to function as fully individuated and rational subjects who have consummate control over their mental functions" (p. 30), which is contradicted by the 'baby brain' stereotype. This notion that pregnant women are, therefore, unable to fulfil the required cultural duties of employment may contribute to maternity discrimination, which is steadily rising (Hackney et al., 2020).

While the experimental work in this thesis generally reported results that were not aligned with the hypotheses, this work responds to growing concerns about the power of 'baby brain' discourses to a) contribute to maternity discrimination, b) reify wider gender stereotypes, c) restrict women's participation and representation in contexts such as the workplace. The work across this thesis was guided by two core research questions and, more broadly, aimed to further understanding of how social cognitive theories may account for performance differences in the unique context of pregnancy. The research questions were:

1. Are women perceived, or stereotyped, to have poor cognitive abilities during their pregnancy, as per the colloquial concept of 'baby brain'?

2. Can social cognitive theories (namely stereotype threat theory and objectification theory) offer insights into women's 'baby brain' performance during pregnancy and early new motherhood?

It is important to note that the work in this thesis aimed to investigate how the tenets of stereotype threat theory and self-objectification theory may exacerbate or worsen existing performance differences in pregnant women and new mothers, compared with other groups (i.e., non-pregnant women controls). It is important here to clarify that the work presented in this thesis does not intend to fully explain 'baby brain' effects by, for example, proposing that 'baby brain' is purely a myth or a social stereotype. In doing so, this may discredit women's experiences during their pregnancy (as reported in Chapter 3, Study 1). Instead, this work aimed to explore how stereotype activation, stereotype threat, and self-objectification may prompt self-evaluation, consume cognitive resources, and thus impede performance. In this sense, the present work offers an alternative account of why women's memory is impacted in pregnancy, which acknowledges the contribution of social context, activation of stereotypes, and self-objectification.

7.2. Overview of empirical studies

This work first reviewed the 'baby brain' literature, highlighting the inconsistencies in cognitive and neurological accounts of memory changes during pregnancy (Chapter 2). Then, the empirical work of this thesis centred around understanding women's first-hand experiences of the memory and mood changes throughout pregnancy using qualitative content analysis (Chapter 3), before moving onto identify the contents of pregnancy-

related stereotypes and how these may compare to other groups (Chapter 4). Finally, the remaining chapters investigated whether activating the 'baby brain' stereotype may harm pregnant women's memory performance, in a way that has been suggested of other groups, such as girls and mathematics performance (Chapter 5) and whether this effect may also be explained by objectification theory (Chapter 6). Memory was selected as the performance focus in this work, given how 'baby brain' is typically categorised by forgetfulness and absentmindedness in the literature (Davies et al., 2018). This work has addressed stereotype content, stereotype threat and objectification of pregnant women. This work is important, given how pregnant women face unique stereotypes, discrimination, and benevolent sexism (Morgan et al., 2013; Sutton et al., 2011). There is also a notable lack of research that explicitly considers social cognition within pregnancy specifically. This research also extends the work which investigates social explanations for ostensibly biological phenomenon in women (e.g., premenstrual syndrome; Chrisler et al., 2006; and nesting behaviours in pregnancy; Shahvisi, 2020). Overall, the empirical work in this thesis produced some notable findings, which are summarised in Table 7.1.

To summarise, Chapter 3 explored women's self-reported experiences of their pregnancy and identified four unique typologies of memory and mood changes. This chapter showed how women self-report both short-term and chronic changes to their memory throughout and following pregnancy, which corroborates the notion of 'baby brain'. Study 4 then investigated how pregnant women are stereotyped by a wider population using the Stereotype Content Model as a theoretical framework. This work found that women generally were perceived to have reduced

cognitive abilities during their pregnancy, relative to other groups. The experimental studies across Chapters 5 and 6 then investigated whether paradigms which a) make gendered expectations of performance salient, b) consume cognitive resources, i.e., stereotype threat and self-objectification, can harm pregnant women's memory functioning.

Generally, these studies did not find the hypothesised effects, which leads to a re-evaluation of the theories in the context of pregnancy. Chapters 5 and 6 did find main Group effects in the experimental studies; for example, Study 4 (Chapter 5) found that pregnant women performed worse than other groups on a Verbal Word Learning Task, whereas Study 6 (Chapter 6) found that new mothers underperformed on this task compared with pregnant women. To elucidate this further, Figure 7.1. plots the average performance of pregnant women, new mothers, and control groups on the two versions of Verbal Word Learning Tasks which were administered across studies. Note that in Study 4, VWLT2 was a random noun task, whereas in Studies 6 and 7 it was a list of baby-related words. This may explain why pregnant women and new mothers' generally performed better on VWLT2 on Study 6 and 7, compared with Study 4, in that it corroborates the existence of a 'reallocation of attention' hypothesis of memory changes during pregnancy (Ziomkiewicz et al., 2019). Generally, these experimental studies generally suggest that there may be an effect of pregnancy or early motherhood on memory ability measured using an immediate recall task. The extent to which the explicit and blatant manipulation of stereotype threat and self-objectification can contribute to that memory change remains unclear and worthy of future research, which this chapter will later cover.

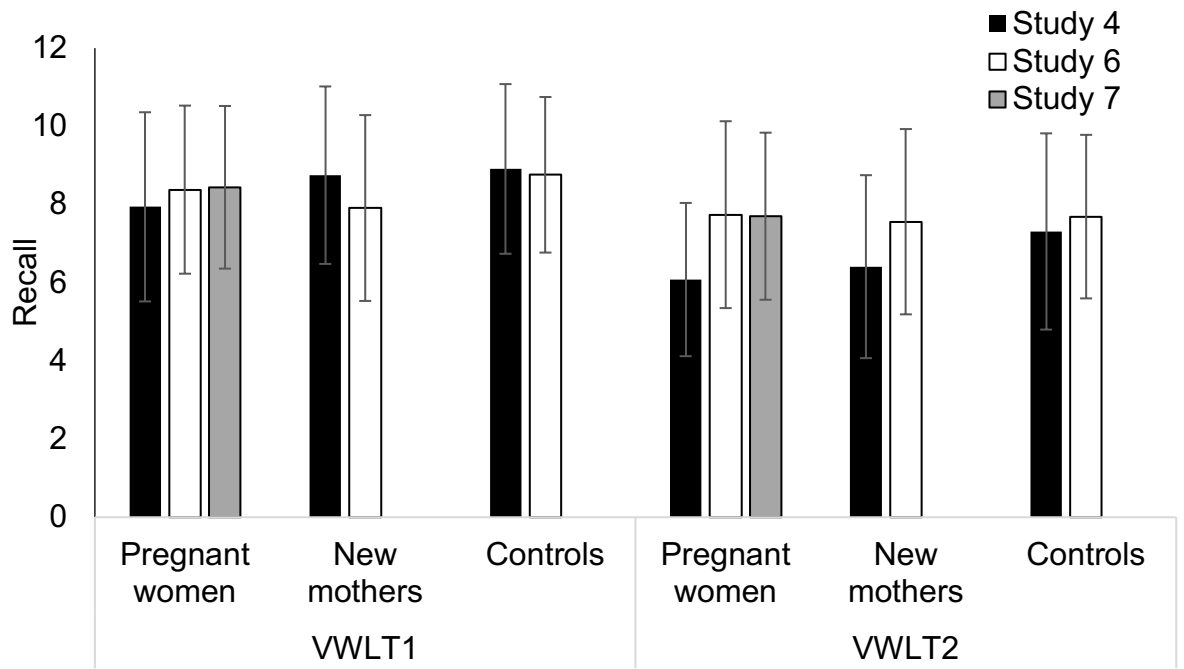


Figure 7.1. Mean recall on Verbal Word Learning Tasks (VWLT) across studies and groups. Study 4 $N = 364$, Study 6 $N = 450$, Study 7 $N = 192$. To recap, Study 4 found that pregnant women performed worst ($p = 0.004$, $n_p^2 = 0.033$), whereas Study 6 found that new mothers performed worse ($p = 0.006$, $n_p^2 = 0.023$).

Table 7.1. Overview of chapters and studies, including research questions and core findings from each study

Chapter	Study	Research question	Core finding
3	1	How do pregnant women and new mothers self-report memory and mood changes?	Women report negative changes to their mood and memory, which are aligned with the notion of 'baby brain'.
4	2	What are the explicit contents of pregnancy stereotypes, relative to other groups?	Pregnant women are generally stereotyped to be high in warmth, low in competence, compared to other groups.
	3	What are the contents of pregnant women in the context of the Stereotype Content Model, using trait generation tasks?	
5	4	Can a stereotype threat paradigm exacerbate 'baby brain' symptoms for pregnant women's memory?	Pregnant women have generally lower memory performance, but this was not worsened by the activation of a 'baby brain' stereotype.
	5	Can a stereotype threat paradigm exacerbate 'baby brain' symptoms for pregnant women's wider cognitive functioning?	
6	6	Can self-objectification contribute to worsening of pregnant women's memory performance?	A self-objectification manipulation generally did not impair cognitive abilities of pregnant women.
	7	Is self-objectification different to a pregnancy-specific form of objectification, and does this affect pregnant women's performance?	
	8	How does an objectification manipulation impact perception of pregnant women?	

7.3. Key findings

In this thesis, the mixed-methods approach to understanding ‘baby brain’ from a social cognitive perspective has led to a rich body of evidence which crucially offers a seldom-heard social perspective on the ‘baby brain’ phenomenon. In centring women’s self-reported experience in the outset of this thesis (Chapter 3), this has used women’s accounts to provide further depth and insight into some of the claims within the ‘objective’ measures of memory performance (as noted in Chapter 2). Chapter 4 also extended the Stereotype Content Model paradigm, demonstrating how warmth and competence are useful anchors to consider the contents of pregnancy stereotypes. The work in this chapter also confirmed that women are generally thought to have reduced cognitive abilities in their pregnancy.

Reaching Chapters 5 and 6, the findings are less conclusive than earlier work in this thesis. Indeed, this experimental work may be best considered as a useful starting point for experimental studies of how social psychological theory may account for the ‘baby brain’ stereotype. The null results reported here should not mean that this research question should be abandoned, but rather, this raises some further questions about how to apply social cognitive theory to this specific stereotype. Indeed, given the novelty of this work, in that this is the first empirical studies of how social cognition may account for differences in pregnant women’s memory, there are no doubt now be clear avenues for future research. This is particularly true given the null results found in Chapter 5 and Chapter 6. It is useful to note here that both of the core theories used in this thesis have previously been subject to failed direct replication studies (e.g., for stereotype threat

theory; Agnoli et al., 2021 and objectification theory; De Wilde et al., 2020) and concerns over publication bias (Flore & Wicherts, 2015). Therefore, the work presented here has also contributed to the ongoing reappraisal of these theories to an understudied population and a unique social stereotype. As scholars within the recent methodological reforms in psychology have argued for, there is value in assessing 'strength of evidence' for an effect rather than disregarding a theory off the basis of one result alone. As the Open Science Collaboration (2015) stress, "a single study almost never provided definitive resolution for or against an effect and its explanation" (pp. 4716). Therefore, given the null results found here, it is useful to explore nuanced theoretical explanations to the findings reported here, rather than dismissing the underlying theories of stereotype threat and objectification.

7.3.1. The impact of stereotype perception

One theoretical explanation for the null effects in the experimental work in this thesis may be a potential incompatibility with the theory and the targeted stereotype of 'baby brain'. For example, one view of stereotype threat is that, for it to have negative performance consequences, members of a stereotyped group must be motivated to avoid confirming the stereotype (according to the mere effort approach; Hutter et al., 2019; Jamieson & Harkins, 2009). If 'baby brain' is not viewed to be sufficiently negative or undesirable, women may not be motivated to avoid confirmation of the stereotype, and thus a stereotype threat paradigm does not influence performance when activating the 'baby brain' stereotype. While there have been other competing explanations for the mechanisms of stereotype threat, such as negative thinking (Cadinu et al., 2005) and working memory

interference (Schmader & Johns, 2003), most models of stereotype threat agree that viewing a stereotype as negative is a defining requirement for effects to occur (Pennington et al., 2016). Therefore, explicitly activating the stereotype of 'baby brain' may not adhere to the necessary requirements for stereotype threat effects to occur. In other words, if pregnant women are not threatened by the notion of having 'baby brain', this will not motivate disapproval of the stereotype, and thus performance will not be affected. The notion that 'baby brain' is not of itself viewed as problematic or undesirable is corroborated by cultural evidence, such as media articles, films, and internet memes, which reference "blaming it on the 'baby brain'" (e.g., BabyCentre Community, 2021; Mums Grapevine, 2019; Steele, 2015). Therefore, implicit activation of the stereotype may be a useful avenue for future research.

Further, for a 'baby brain' stereotype threat to be effective, there should be a notable difference between the experimental group (who receive the threat) and the control group of pregnant women and new mothers who do not receive the explicit stereotype threat in the experimental study design. However, it may be argued that all women are acutely aware of the 'baby brain' stereotype throughout their pregnancy, particularly in the context of a memory task. For example, Hurt (2011, p. 391) refers to 'baby brain' as a "powerful cultural discourse" which affects pregnant women and women in the postpartum period. Therefore, if 'baby brain' is a powerful stereotype and all women throughout pregnancy have an acute awareness of it, this may in effect 'cancel out' any differences between stereotype threat experimental groups, leading to null results. This may partly explain the presence of main

effects of Group in the stereotype threat work (Chapter 5) and the absence of main effects of stereotype threat and interactive effects.

To delineate this further, future research may alter the nature of the control condition in experimental investigations of 'baby brain' in pregnancy, to test whether absence of information concerning 'baby brain' may lead to stronger threat effects. There are generally two types of control condition in stereotype threat paradigms. Some stereotype threat research, including the present work, uses 'nullified' control conditions, where there is an "active threat removal" (Flore & Wicherts, 2015, p. 32), for example, "there are no differences between the cognitive performance of pregnant women and other groups". In contrast, other studies have used control conditions which comprise of an absence of any information related to the stereotype. Future research may employ this strategy, in order to avoid inadvertently prompting a further reminder of 'baby brain', which may serve to cancel out between-condition differences.

7.3.2. The impact of testing context

There may also be theoretical explanations for the lack of significant stereotype threat and self-objectification effects here. For example, research and theory demonstrate how stereotype threat effects work by targeting performance in specific and well-defined domains (Steele, 1997); therefore, the negative stereotype that is made salient should relate directly to one's ability to perform in a certain task or set of tasks. The nature of the stereotyped performance in question can determine whether stereotype threat effects are likely to inhibit success. For example, stereotype threat effects occur more prominently in tasks that are difficult and demanding

enough to induce performance concerns, and thus 'task difficulty' is frequently cited as an important moderator in stereotype threat work (Hess et al., 2009; Keller, 2007).

In a similar sense, Brown and Pinel (2003) stress that in stereotype threat research, the extent to which a testing context is "public" versus "private" could affect stereotype threat effectiveness, and testing contexts can moderate stereotype threat effects. For example, to use Davies et al.'s (2005) term, stereotype threat testing in an "identity-safe environment" (p. 276), whereby the vulnerabilities of the stigmatised group are not exposed to others and therefore are less debilitating, may not induce performance concerns. In line with this, research also suggests that stereotype threat effects are heightened in situations whereby an individual is a 'token group member' (Sekaquaptewa & Thompson, 2003). Therefore, the present studies may have yielded null results because the Verbal Word Learning Tasks were not suitably challenging and thus participants did not feel suitably 'threatened' by either the testing context, nature of the threat, or task itself. While there was no evidence for ceiling effects in the memory tasks, which suggests there was appropriate variability in performance, the issue of not eliciting a state of threat cannot be ruled out as an explanation for null effects.

7.3.3. The impact of control groups

Furthermore, one explanation of the null interactive effects reported here may be the lack of a 'true control' in the experimental studies. That is, if it is expected that a 'baby brain' stereotype would have an additive interactive effect on performance, these effects would need to be notable in

order to be detected. In other words, if it is expected that pregnant women and new mothers will show main effects deficits in cognitive performance (owing to, for example, biological changes and cognitive reorganisation), the existence of a stereotype threat would need to worsen performance to a large enough extent to detect this in an interaction above and beyond the main effect, relative to the control group. The null effects may thus be explained by either a) the small effect size of stereotype threat itself (Zigerell, 2017), or b) the lack of a 'true control' in the experimental studies, i.e., a group that would not be affected by either a memory task or a 'baby brain' stereotype. A methodological improvement would be the addition of a group that is entirely separate from both the stereotype and the performance task, such as men. If men were recruited as a control group in the experimental stereotype threat and self-objectification studies, this would serve as a group who should not be in any way impacted by the contents of the stereotype or self-objectification manipulation. Currently, it may be argued that the control groups used in the present work (i.e., never pregnant women) could still be affected or threatened by the manipulations used in this work, given the gendered dimension of 'baby brain' and the stereotypes which exist surrounding women's cognitive abilities (e.g., Nguyen & Ryan, 2008). This could reduce the likelihood of detecting interactive effects.

7.4. Strengths and limitations

A strength of this thesis is the mixed-methods, multi-study approach that was adopted. The diversity in methodologies and the process of aiming to conceptually replicate experimental findings means that this work thoroughly appraises the research questions set out at the beginning of this

thesis. Study 3, in particular, offers a unique and seldom-heard perspective on the 'baby brain' conversation, centring women's self-reported experiences in the research. Further, Study 4 also ties together research spanning decades worth of feminist research on gender stereotyping, to specifically focus on the contents of pregnancy stereotypes. This approach offers a unique and important contribution to the 'baby brain' literature.

Despite the contributions to the literature, the mixed-methods design, and the methodological strengths of the work presents here, there are also limitations that should be acknowledged. Most notably, the samples in this study were generally White, educated, and based in the UK. This means that the generalisability of the studies is limited to this specific population. There may be more value in adopting a more intersectional consideration of stereotype threat and objectification. For example, recent research has shown how there are difference in how self-objectification manifests into behavioural outcomes between White, Black, and Hispanic women (Schaefer et al., 2018), such that Black women generally report lower levels of self-surveillance in response to self-objectification. Similarly, there are unique stereotypes that Black pregnant women must contend with, as per the notion of "racialized pregnancy stigma" (Mehra et al., 2020, p. 484). Therefore, future research should respond to calls to challenge the Western, educated, industrialized, rich and democratic (WEIRD) default within social psychological research (e.g., see Henrich et al., 2010).

7.4.1. Online testing

Secondly, all of the studies presented in this thesis were conducted online, due to a) feasibility concerns when recruiting pregnant women, b) the

COVID-19 pandemic, and c) evidence that suggests performance in online studies largely reflects in-lab testing (Horton et al., 2011). For Chapter 3 and 4, this context may be advantageous. For example, online collection of qualitative data has been thought to have improved accessibility and reach, compared with in-person testing (e.g., Braun et al., 2020). Further, online testing of Chapter 4 may have reduced social desirability biases impacting participants' appraisals of the target groups.

In terms of the impact of online testing on the experimental work (across Chapters 5 and 6), there is evidence to suggest that testing context (i.e., online versus in the lab) does not impact performance on behavioural tasks. For example, Casler et al. (2013) compared the performance of participants recruited online with in-lab participants on a behavioural task. The online participants conducted an adapted version of the in-lab behavioural task. Overall, the authors concluded that online adaptation was highly effective and responses across the two testing conditions were equivalent. For example, Horton et al. (2011, p. 399) conclude that “online experiments can be just as valid—both internally and externally—as laboratory and field experiments”. While, generally, studies have shown equitable performance in online versus laboratory contexts, this does dramatically alter the settings of experimental studies, which should be used to contextualise findings. For example, in the stereotype threat literature, some studies have found strong stereotype threat effects in online paradigms (e.g., in female gamers; Albuquerque et al., 2017), and studies using field, laboratory, or applied settings have also found effects (e.g., women in the workplace; von Hippel et al., 2015). Similarly, experimental

manipulations of self-objectification have been found in both online (e.g., Calogero, 2013), and field based (Felig et al., 2021) paradigms.

However, online testing is also inherently less controlled than in-person testing; therefore, factors such as mind wandering or distraction may also affect results in this work (Schuster et al., 2015). Also, it is possible that participants recruited online may not be legitimately eligible for participation. Therefore, the reappraisal of stereotype threat theory as an explanation for performance deficits in stereotyped groups should also continue to test the effects of threats in varied testing conditions. There is evidence for stereotype threat effects in various field settings, for example in the classroom (Huguet, & Régner, 2007; Stricker & Ward, 2004) and the workplace (Neal-Jackson, 2020). Future work should now consider whether different manipulations of stereotype threat (including, but not limited to, the ‘baby brain’ stereotype) can be found in online testing sessions, to contribute towards the reappraisal of stereotype threat as a robust theory in light of publication bias concerns. Also, while online testing is not ‘the field’, this may go some way in addressing the tendency for social psychological theories to be based solely from “decontextualised laboratory data” that does not reflect more ‘real world’ contexts (Berkman & Wilson, 2021, p 1).

7.4.2. Blatant versus subtle stereotype threats

Furthermore, Casler et al., (2013) also note how online testing, such as via MTurk (a US-based recruitment service equivalent to Prolific), allow researchers to recruit more diverse samples with a significantly higher age compared with the typical sample of in-person testing. Therefore, on a logistical level, online data collection is a useful tool, particularly when

recruiting niche samples such as those described in this chapter. There are, however, some theoretical considerations of online testing of stereotype threat theory. Online testing means that predominantly blatant stereotype threat manipulations are used, as opposed to more subtle threat cues, for example, gender of experimenter in-lab testing contexts (Stone & McWhinnie, 2008). This allows us to have more control, in an experimental sense, over the types of primes that the study is manipulating. It is not clear whether blatant or subtle stereotype threats impact performance more; Stone and McWhinnie (2008) concluded that blatant threats are more impactful, whereas a review by Nguyen and Ryan (2008) concluded the opposite. However, it may also be argued that more subtle activations of stereotypes are more aligned with 'real world' experiences of navigating stereotype activation in the field. Therefore, in the context of 'baby brain' perceptions, future work should employ subtle stereotype threats to test whether the nature of the threat delivery impacts performance, in a way that has been suggested of other groups (e.g., older adults and memory stereotype threat' Armstrong et al., 2017).

7.4.3. Focus on individual performance

Moreover, as a more theoretical limitation, it is useful to also consider if the question of whether pregnant women's cognitive performance itself should be the focus of work which aims to dismantle 'baby brain'. Indeed, it may be more appropriate to now extend the work which investigates how pregnant women are perceived by other people (as per Chapter 3, Study 2-3; Chapter 6, Study 8), through a lens of social cognition, rather than focusing specifically on contributors to women's actual performance. Indeed,

it may even be argued that efforts to improve women's memory performance itself will not impact perceptions of women throughout pregnancy, given how deeply ingrained the 'baby brain' stereotype is culturally (Longhurst, 1999, 2008; Hurt, 2011). Therefore, a limitation of the present study is that it may promote the individualised view of 'baby brain' that has been critiqued in the literature (Hurt, 2011). In this sense, by locating the locus on pregnant women's performance when under a stereotype threat and/or state of self-objectification, this may inadvertently promote the idea that pregnant women's performance is the source of the stereotype. This limitation applies to all stereotype threat and self-objectification research. However, other applications arguably have more 'real world' applications that make them more aligned to a study of performance. For example, in the classic paradigm of applying stereotype threat to women and girl's maths performance is able to speak directly to performance gaps on real-world tests (e.g., undergraduate exams; Davies et al., 2016). In the case of 'baby brain', however, there is a less clear 'real world' application that is directly tied to cognitive performance. To address this limitation, future research should now apply this paradigm in pregnancy to more applied contexts, for example, job evaluations or other 'real world' tests of competence.

Furthermore, it may be useful to adopt the approach of Chrisler et al. (2006), who study premenstrual syndrome (PMS) through a social psychological lens. This body of research has considered wider social issues related to the study of PMS, including an investigation of how women experiencing PMS are constructed in popular press (Chrisler & Levy, 1990), an analysis of how PMS is pathologized (Chrisler & Caplan, 2002), and a social comparative approach to how women perceive their own PMS

symptoms (Chrisler et al., 2006). These approaches are compatible with the study of 'baby brain', and should be used to inspire wider work in this area.

7.5. Reflections and future directions

This thesis set out to provide an alternative account of 'baby brain' in pregnancy, in response to concerns and inconsistencies with the neurological, cognitive, and evolutionary investigations into this phenomenon. The work presented here thus represents a starting point for a novel scheme of research, rather than a conclusive set of answers to the 'baby brain' question. The most well-established stereotype threat and self-objectification findings, such as the effects of a gendered stereotype and self-objectification on girls' mathematics performance, have been subject to decades worth of research (see reviews by Daniels et al., 2020; Flore & Wicherts, 2015). This has allowed researchers to pinpoint the specific testing contexts, moderators and mediators, personality influences, and task requirements that may elicit the expected effects in this population. Given the novelty of the present research, more work now is needed to continue to precisely understand how and when stereotype threat and self-objectification effects may occur in the specific context of pregnancy. This requires further investigations into the unique moderators, mediators, testing considerations, and task requirements that are relevant for pregnant women. Therefore, future work in this area should now consider two core avenues for research, 1) a continuation of investigations into how stereotype threat and objectification may impact pregnant women's cognition, taking into account mediators, moderators, and contextual factors, 2) alternative social cognitive theories to explain 'baby brain'.

7.5.1. Future directions

As discussed above, there may be value in not yet abandoning stereotype threat and self-objectification paradigms as explanations of 'baby brain', in light of the null results here. There are likely situational, social, and individual factors that impact how stereotype threat and self-objectification manipulations affect women in different ways. Therefore, to further understand how the presence of stereotyping and objectifying messages may impact women in pregnancy, future research should aim to replicate the studies presented here, taking into account wider moderators and mediators of the effects. Furthermore, there would be great value in extending the work of Chapter 3, by using qualitative methodologies to understand further women's lived experiences of navigating 'baby brain'. Indeed, qualitative research offers a richer, more nuanced account of women's experiences, in a way that simply cannot be accounted for in experimental conditions (e.g., see Clark et al., 2009 for qualitative work on women's body image during pregnancy). An interview study with pregnant women that directly explores how 'baby brain' as a social discourse is navigated, interpreted, and contested throughout pregnancy would add richness to the ongoing debates in the literature. While the qualitative work of Chapter 3 is a useful starting point, more in-depth qualitative work now should specifically investigate how women deal with, resist, embrace, or come to terms with the notion of 'baby brain' in their pregnancy.

7.5.2. Alternative social theories

While the studies here generally did not find evidence for stereotype threat or self-objectification effects, that is not to say that other theories

stemming from a social psychological approach may not be useful perspectives. For example, social comparison theory (Festinger, 1954) may be a useful framework to further consider pregnant women's cognition. Indeed, it may be that women's perceptions of their memory changes differ not only based on the presence of stereotyping and objectification, but only on the presence of other women who serve as a source of comparison. This approach has been used in other relevant literature. For example, Chrisler et al. (2006) investigated how women's perceptions of their premenstrual symptoms differ when a social comparison dimension was involved. That is, women showed a tendency to believe that other women's premenstrual symptoms are worse than their own. There may be scope to apply this paradigm to the study of 'baby brain', to investigate whether women under- or over-estimate their own symptoms of 'baby brain' relative to other women. Similarly, there is scope for this research paradigm to now be shifted to respond to calls for research into how mothers and pregnant women internalise, resist, and negotiate motherhood myths (e.g., Johnston & Swanson, 2003).

Furthermore, future work should also continue to interrogate how different individual and contextual dimensions may contribute to stereotype threat effects, memory decline, and self-objectification in pregnancy. For example, there is literature which shows how personality factors impact women's memory performance during pregnancy; Casey (2000) concluded that personality factor of conscientiousness and self-reported pregnancy anxiety predicted forgetfulness and absentmindedness in pregnancy. Therefore, women who experience more pregnancy anxiety may also experience more task-performance related anxiety in the face of a

stereotype threat, and thus perform worse when in a state of stereotype threat. The dimension of personality or self-reported anxiety was not assessed in the present work and should be an avenue for future study in this area.

Finally, it is also important to note that, while the present work aimed to respond to concerns and issues with 'objective' tests of pregnant women's memory performance, it has not directly and explicitly tested the claims made in this literature. In other words, the work presented here has offered an alternative account of 'baby brain' but has not directly compared and contrasted cognitive accounts of 'baby brain' with the proposed social cognitive accounts. Thus, while this work has identified a useful area for future study, which may be useful in order to better understand 'baby brain' in pregnancy, it has not considered which perspective (i.e., cognitive, neurological, evolutionary, or social) may best account for the 'baby brain' effect. Future work should, therefore, aim to address this more explicitly by bringing together competing approaches within empirical studies. This could be achieved in practice by, for example, combining stereotype threat and self-objectification paradigms with cognitive methodologies in a sample of pregnant women, to fully understand whether presence of a threat or objectifying cue can harm performance and cognition more broadly. For example, a future study could test whether subtle or blatant stereotype activation within a neuroimaging study (e.g., using electroencephalogram; Dahan, 2021) alters both pregnant women's neuropsychological responses and subsequent cognitive performance.

7.6. Conclusion

To conclude, the literature review plus eight empirical studies reported in this thesis have each aimed to bring a social cognitive perspective to the study of 'baby brain'. This work has identified that women generally do self-report changes to their memory and mood during pregnancy (Chapter 3) and are stereotyped to have poorer cognitive abilities. However, stereotype threat and self-objectification manipulations designed to activate 'baby brain' stereotypes to pregnant women overall did not harm performance in the way that was expected. This work ultimately extends understanding of 'baby brain', calling into question how the presence of stereotypes and objectification may impact women in their pregnancy. To date, investigations into 'baby brain' almost exclusively derive from cognitive, neuropsychological, evolutionary, or biological perspectives. Future work should now continue advancing social cognitive appraisals of cognitive decline in pregnancy, by directly comparing competing theories of 'baby brain', in order to further understand women's experiences in this unique stage of reproductive life. Indeed, if 'baby brain' research continues to disregard social context, researchers' ability to fully understand women's experiences during this stage of life will remain limited.

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Appendices

Appendix A: Study 2 materials

Information sheet:

You are being invited to participate in a research study. This study is being carried out by Madeleine Pownall, supervised by Dr Russell Hutter and Professor Mark Conner, from the University of Leeds. The purpose of this research study is to explore how the abilities of different groups of people are judged, and will take you approximately 15 minutes to complete. In this online survey you will be asked to give ratings of the average abilities of 14 different groups of people.

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous. We will store responses to the survey anonymously. Data will be stored securely in accordance with General Data Protection Regulation (GDPR) legislation and the British Psychological Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study.

Are there any risks involved with participation?

We believe there are no known risks associated with this research study; however, as with any online related activity the risk of a breach is always possible. To the best of our ability your participation in this study will remain confidential, and only anonymised data will be published. We will minimise any risks by asking you for a participant code at the beginning of the study, and all data will be stored within a password-protected online folder, only accessible to the researchers. This study has been granted ethical approval by the University of Leeds School of Psychology Ethics Board (ref: PSC-457)

End of Block: Brief

Start of Block: Consent form

Consent form

I have read and understood the information sheet (1) ▼ Yes (1)

I understand that I may withdraw at any point during this study by closing the window, without having to supply a reason (2) ▼ Yes (1)

I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998. (3) ▼ Yes (1)

I understand that confidentiality and anonymity will be maintained by the researchers and it will not be possible to identify me in any publications. (4) ▼ Yes (1)

I consent to participate in this study (5) ▼ Yes (1)

End of Block: Consent form

Start of Block: Demographics

Please enter your age

How would you define your gender?

- Male (1)
 - Female (2)
 - Gender fluid/non-binary (5)
 - Other (6)
-

What is your ethnicity?

- Asian or Asian British (1)
- Black or Black British (2)
- Mixed (3)
- White British (4)
- Other ethnic group (including Chinese) (5)

How would you define your sexual orientation?

- Heterosexual (straight) (1)
- Bisexual (2)
- Lesbian/Gay woman (3)
- Gay man (4)
- I'd prefer not to say (5)
- Other (6)

Are you a parent?

- Yes (1)
- No (2)
- I'd prefer not to say (3)

What is your highest level of education?

- Doctoral degree (1)
 - Masters degree or equivalent (2)
 - Bachelor's degree or equivalent (3)
 - A Levels or equivalent (4)
 - GCSEs or equivalent (5)
 - No qualification (6)
 - Other qualifications (7)
-

End of Block: Demographics

Start of Block: Task description

You will now be asked to rate 14 groups of people across different skills and traits. Please try to be as honest as possible and be reminded that there are no right or wrong answers. All your responses are anonymous, meaning that they can't be traced back to you in any way.

End of Block: Task description

Start of Block: Judgements

How would you rate the ability of a **[teenage boy/teenage girl/pregnant woman/middle-aged man/middle-aged woman/mother with a young child/father with a young child/new father/new mother/elderly**

man/elderly woman/working mother/working father/pregnant teenage girl]* to:

	Extremely below average (1)	Below average (2)	Average (3)	Above average (4)	Extremely above average (5)
Correctly remember information (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve a logic problem (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complete a mathematics equation (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Empathise with others (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort and support other people (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lift a heavy object (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Respond compassionately to a person in distress (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Note: each group was presented to participants in turn. For conciseness, they are condensed here for ease of reading*

Start of Block: Section divider 2

The next section of this survey will ask a few brief questions that are related to the ratings you just gave.

Start of Block: End questions

“Cognitive abilities’ refers to how well someone performs on brain-based tasks, which may include problem-solving, memory, attention, concentration,

and language”. To what extent do you think there is a difference between the cognitive abilities of **women** compared to **men**?

- There is no difference (1)
- There is a moderate difference (2)
- There is a big difference (3)

How would you describe this difference?

- Women have much weaker cognitive abilities (1)
- Women have moderately weaker cognitive abilities (2)
- There is no difference (3)
- Women have moderately stronger cognitive abilities (4)
- Women have much stronger cognitive abilities (5)

To what extent do you think there is a difference between the cognitive abilities of **pregnant women** compared to **non-pregnant women**?

- There is no difference (1)
- There is a moderate difference (2)
- There is a big difference (3)

How would you describe this difference?

- Pregnant women have much weaker cognitive abilities (1)
- Pregnant women have moderately weaker cognitive abilities (2)
- There is no difference (3)
- Pregnant women have moderately stronger cognitive abilities (4)
- Pregnant women have much stronger cognitive abilities (5)

End of Block: End questions

Start of Block: Section divider 3

Thank you for taking part in this study! I really appreciate you taking the time to share your responses. This study is a pilot study that is part of my PhD, which is looking at stereotypes of different groups. The purpose of this study was to look at how a general population views different groups, especially different groups of women. This will form the basis of later studies which will investigate how we may be able to overcome stereotypes that relate to cognitive abilities. This study was granted ethical approval by the University of Leeds School of Psychology Ethics Board (ref: PSC-457) For further information about my research please contact me directly on M.V.Pownall@leeds.ac.uk.

For SurveyCircle users (www.surveycircle.com): The Survey Code is: 6MAS-5CXD-VSNA-ENLM. Many thanks, Madeleine Pownall

End of Block: Debrief

Appendix B: Study 3 materials

Information sheet:

Who is the researcher?

Hello, my name is Madeleine Pownall and I am a PhD researcher in the School of Psychology at the University of Leeds. I am interested in the way people view other groups of people. This work is supervised by Dr Russell Hutter and Professor Mark Conner, both at the University of Leeds. If you have any questions about this work or any of my PhD studies, please feel free to contact me on M.V.Pownall@leeds.ac.uk

Am I eligible to participate?

Please note that to be eligible to participate, you must be above 18 years old.

What will I be asked to do?

This online experiment, which will take approximately 5 minutes you will be asked to create a list describing a group of people. There will be no time limit, but please list as many words as possible.

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing. Once you submit your data, you will not be able to withdraw your responses, as no identifiable information is collected.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous. We will store responses to the survey anonymously. Data will be stored securely in accordance with the British Psychological Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study.

What will you do with my responses?

The data from this study will be stored confidentially for 6 years after completion. The results from this study will be published as a peer-reviewed journal article and may be presented at academic conferences. If you wish, you may contact the researcher for a copy of any research outputs derived from your participation in this experiment.

What if I have a question that hasn't yet been answered?

Please only continue with this experiment if you are happy that all of your questions have been answered, and you feel fully informed.

This has been approved by the University of Leeds School of Psychology Ethics Board (Ref: PSC-772)

When you feel ready, please complete the consent form below, indicating that you are fully informed as to the procedure of the experiment and you are happy to continue:

This study will last approximately 5 minutes.

End of Block: Info sheet

Start of Block: Ratings

Please list as many specific traits and behaviours that you think are associated with **[pregnant women/women/men/new mothers (a woman with a baby less than 2 years old)]**

Start of Block: Demographics

Please enter your age

How would you define your gender?

- Male (1)
 - Female (2)
 - Gender fluid/non-binary (3)
 - Other (6)
-

What is your ethnicity?

- Asian or Asian British (1)
- Black or Black British (2)
- Mixed (3)
- White British (4)
- Other ethnic group (including Chinese) (5)

How would you define your sexual orientation?

- Heterosexual (straight) (1)
- Bisexual (2)
- Lesbian/Gay woman (3)
- Gay man (4)
- I'd prefer not to say (5)
- Other (6)

Are you a parent?

- Yes (1)
- No (2)
- I'd prefer not to say (3)

What is your highest level of education?

- Doctoral degree (1)
 - Masters degree or equivalent (2)
 - Bachelor's degree or equivalent (3)
 - A Levels or equivalent (4)
 - GCSEs or equivalent (5)
 - No qualification (6)
 - Other qualifications (7)
-

End of Block: Demographics

Start of Block: Debrief

Thank you for taking part in this study! I really appreciate you taking the time to share your responses. This study is part of my PhD, which is looking at stereotypes about pregnant women. The purpose of this study was to look at how a general population views both pregnant and non-pregnant women. This will form the basis of later studies which will investigate how pregnant

women may be able to overcome stereotypes about their cognitive abilities. For further information about my research please contact me directly on M.V.Pownall@leeds.ac.uk Many thanks, Madeleine Pownall

End of Block: Debrief

Appendix C. Study 4 materials

Information sheet

Thank you for considering participating in my research. Please note that for ease of reading and accessibility, it is advised that you complete this experiment on a desktop screen (i.e. computer or laptop) rather than a handheld device (e.g. a mobile phone). It is also advised to complete this experiment in a time and place that is quiet and free from distractions.

Who is the researcher?

Hello, my name is Madeleine Pownall and I am a PhD researcher in the School of Psychology at the University of Leeds. I am interested in how social mechanisms may account for differences in cognitive functioning, such as the memory task in this experiment. This work is supervised by Dr Russell Hutter and Professor Mark Conner, both at the University of Leeds. If you have any questions about this work or any of my PhD studies, please feel free to contact me on M.V.Pownall@leeds.ac.uk

Am I eligible to participate?

This work is interested in investigating memory function and beliefs about gender. Please note that to be eligible to participate, you must be above 18 years old.

What will I be asked to do?

This online experiment, which will take approximately 15-20 minutes, can be completed in a time and place that is convenient to you. In the experiment, you will first answer a few demographic questions and then a personality scale. You will then be asked to complete two different variations of a memory task. This will involve showing you a list of 15 different words that will flash up on the screen. You will then be redirected to a survey page that will ask you to list as many of the items as you can remember. This task will be repeated twice. Lastly, you will be asked to complete two scales that ask an array of questions related to your attitudes and beliefs.

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous. We will store responses to the survey anonymously. Data will be stored securely in accordance with General Data Protection Regulation (GDPR) legislation and the British Psychological

Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study.

What will you do with my responses?

The data from this study will be stored confidentially for 6 years after completion. The results from this study will be published as a peer-reviewed journal article and may be presented at academic conferences. If you wish, you may contact the researcher for a copy of any research outputs derived from your participation in this experiment.

What if I have a question that hasn't yet been answered?

Please only continue with this experiment if you are happy that all of your questions have been answered, and you feel fully informed. When you feel ready, please complete the consent form below, indicating that you are fully informed as to the procedure of the experiment and you are happy to continue:

Consent form

I have read and understood the information sheet (1) ▼ Yes (1)

I consent to participate in this study (2) ▼ Yes (1)

What is your Prolific ID?

Please enter your age

What is your ethnicity?

- Asian or Asian British (1)
- Black or Black British (2)
- Mixed (3)
- White British (4)
- Other ethnic group (including Chinese) (5)

What is your highest level of education?

- Doctoral degree (1)
 - Masters degree or equivalent (2)
 - Bachelor's degree or equivalent (3)
 - BTEC or equivalent (4)
 - A Levels, AS levels, or equivalent (5)
 - GCSEs or equivalent (6)
 - High school (7)
 - No qualification (8)
 - Other qualifications (9)
-

Are you currently in paid employment?

- Yes (1)
- No (2)

What is your current marital status?

- Married (1)
- Widowed (2)
- Divorced (3)
- Separated (4)
- Living with spouse (5)
- Never married (6)
- Civil Partnership (7)

End of Block: Demographics

Start of Block: Group allocation

Which of the eligible groups are you a member of?

- I am a primigravid (first time) pregnant woman (1)
- I am a mother to a child less than 2 years old (2)
- I am a woman who has never been pregnant (3)

Are you over 18 years old?

- Yes (1)
- No (2)

End of Block: Group allocation

Start of Block: Mother

When you were pregnant, did you notice any changes to your memory?

- No (1)
 - Yes, please provide an example or description if you can (2)

-

When you were pregnant, did you notice any changes to your mood?

- No (1)
- Yes, please provide an example or description if you can (2)

End of Block: Mother

Start of Block: Pregnant

How far along in your pregnancy are you?

- First trimester (1)
- Second trimester (2)
- Third trimester (3)

Have you noticed any changes to your memory so far in your pregnancy?

- No (1)
- Yes, please provide an example or description if you can (2)

Have you noticed any changes to your mood so far in your pregnancy?

- No (1)
- Yes, please provide an example if you can (2)

End of Block: Pregnant

Start of Block: Stereotype threat manipulation - experimental

Stereotype threat condition: You will now be asked to complete a memory task.

Research shows that due to a phenomenon known as "baby brain", **pregnant women and women with young children** tend to perform **worse** on these kind of tasks (Baby Centre, 2015).

End of Block: Stereotype threat manipulation - experimental

Start of Block: Stereotype threat manipulation - control

Control condition: You will now be asked to complete a memory task.

Research has **not** found any differences between pregnant women, women with young children, and non-pregnant women on these kind of tasks

End of Block: Stereotype threat manipulation - control

Start of Block: Memory task - shopping list

You will be shown a list of supermarket items on the screen.

You will then be asked to write down all of the items you remember seeing. Please don't write down any of the items when they are shown to you - we're really interested in capturing your genuine responses to this task.

READY TO BEGIN?

BREAD

HAM

EGGS

RICE

OIL

JAM

FISH

SOUP

CHEESE

MILK

CAKE

GRAPES

BEANS

MEAT

End of Block: Memory task - shopping list

Start of Block: Recall - shopping list



Now try to write down as many of the items that you remember as possible

End of Block: Recall - shopping list

Start of Block: Memory task - nouns

You will now complete the same task again but this time with 15 unrelated items in exactly the same format as before.

READY TO BEGIN?

- HORSE
- KNIFE
- TREE
- HAND
- CHAIR
- BULB
- GATE
- HOOP
- MOUSE
- YARN
- STICK
- FRUIT
- SOCK
- PLANT

Now try to write down as many of the items that you remember as possible

End of Block: Recall

Start of Block: Mother identity identification measure

A few final brief questions now about your self-image

Being a mother is an important part of my self-image

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Being a mother is unimportant to my sense of what kind of person I am

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Being a mother is an important reflection of who I am

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Being a mother has little very little to do with how I feel about myself

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

End of Block: Mother identity identification measure

Start of Block: Memory identification measure

I have a good memory

- Strongly disagree (1)
 - Disagree (2)
 - Neither agree nor disagree (3)
 - Agree (4)
 - Strongly agree (5)
-

Appendix D. Study 6 materials

Information sheet:

Thank you for considering participating in my research. Please note that for ease of reading and accessibility, it is advised that you complete this experiment on a desktop screen (i.e. computer or laptop) rather than a handheld device (e.g. a mobile phone). It is also advised to complete this experiment in a time and place that is quiet and free from distractions.

Please be advised that in this study you may be asked to recount experiences of sexual objectification. If you think this will be difficult for you, please do not progress with this study.

Who is the researcher?

Hello, my name is Madeleine Pownall and I am a PhD researcher in the School of Psychology at the University of Leeds. I am interested in how social mechanisms may account for differences in cognitive functioning, such as the memory task in this experiment. This work is supervised by Dr Russell Hutter and Professor Mark Conner, both at the University of Leeds. If you have any questions about this work or any of my PhD studies, please feel free to contact me on M.V.Pownall@leeds.ac.uk

Am I eligible to participate?

This work is interested in investigating the memory function of 3 different groups of women. These groups are: pregnant women, women who have a child less than 2 years old, and women who have never been pregnant. You

are eligible to participate if you fall into one of these three categories. Please note that to be eligible to participate, you must be above 18 years old.

What will I be asked to do?

This online experiment, which will take approximately 10-15 minutes, can be completed in a time and place that is convenient to you. In the experiment, you will first answer a few demographic questions and then a short writing task (approximately 50 words). You will then be asked to complete two different variations of a memory task. This will involve showing you a list of 15 different words that will flash up on the screen. You will then be redirected to a survey page that will ask you to list as many of the items as you can remember. This task will be repeated twice

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous and later uploaded to the Open Science Framework to support publication of this research. We will store responses to the survey anonymously. Data will be stored securely in accordance with General Data Protection Regulation (GDPR) legislation and the British Psychological Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study.

What will you do with my responses?

The results from this study will be published as a peer-reviewed journal article and may be presented at academic conferences. If you wish, you may contact the researcher for a copy of any research outputs derived from your participation in this experiment.

What if I have a question that hasn't yet been answered?

Please only continue with this experiment if you are happy that all of your questions have been answered, and you feel fully informed.

When you feel ready, please complete the consent form below, indicating that you are fully informed as to the procedure of the experiment and you are happy to continue:

Consent form

- I have read and understood the information sheet (1)
- I consent to participate in this study (2)
- I understand that I am able to withdraw at any stage in the experiment (3)

What is your Prolific ID?

Please enter your age

What is your ethnicity?

- Asian or Asian British (1)
 - Black or Black British (2)
 - Mixed (3)
 - White British (4)
 - Other ethnic group (including Chinese) (5)
-

What is your highest level of education?

- Doctoral degree (1)
 - Masters degree or equivalent (2)
 - Bachelor's degree or equivalent (3)
 - BTEC or equivalent (4)
 - A Levels, AS levels, or equivalent (5)
 - GCSEs or equivalent (6)
 - High school (7)
 - No qualification (8)
 - Other qualifications (9)
-

Are you currently in paid employment?

- Yes (1)
- No (2)

What is your current marital status?

- Married (1)
- Widowed (2)
- Divorced (3)
- Separated (4)
- Living with spouse (5)
- Never married (6)
- Civil Partnership (7)

End of Block: Demographics

Start of Block: Group allocation

Which of the eligible groups are you a member of?

- I am a pregnant woman (1)
- I am a mother to a child less than 2 years old (2)
- I am a woman who has never been pregnant (3)

Are you over 18 years old?

- Yes (1)
- No (2)

End of Block: Group allocation

When you were pregnant, did you notice any changes to your memory?

- No (1)
 - Yes, please provide an example or description if you can (2)
-

When you were pregnant, did you notice any changes to your mood?

- No (1)
 - Yes, please provide an example or description if you can (2)
-

How far along in your pregnancy are you?

- First trimester (1)
- Second trimester (2)
- Third trimester (3)

Have you noticed any changes to your memory so far in your pregnancy?

- No (1)
 - Yes, please provide an example or description if you can (2)
-

Have you noticed any changes to your mood so far in your pregnancy?

- No (1)
 - Yes, please provide an example if you can (2)
-

End of Block: Pregnant

Start of Block: Writing task.

We're now going to ask you to complete a short writing task.

End of Block: Writing task.

Start of Block: State self-objectification measure - experimental

Self-objectification condition: Please take a moment to think about a time when you felt that somebody was sexually objectifying you. For example, somebody was gazing at you or evaluating you in a sexualized way, making sexual comments about your body, or whistling at you on the street, etc. Think about what took place - where you were, who you were with, how you felt, what you were thinking, and write about your experience in the space below.

Please aim to write at least 50 words. If you would rather not answer this question, you can withdraw by closing this browser to exit the survey.

End of Block: State self-objectification measure - experimental

Start of Block: State self-objectification measure - control

Control: Please write down a list of different colours (e.g. blue, green, red).

Please aim to write at least 50 words.

End of Block: State self-objectification measure - control

Start of Block: Memory task - shopping list

You will be shown a list of supermarket items on the screen. You will then be asked to write down all of the items you remember seeing. Please don't write

down any of the items when they are shown to you - we're really interested in capturing your genuine responses to this task.

READY TO BEGIN?

BREAD

HAM

EGGS

RICE

OIL

JAM

FISH

SOUP

CHEESE

MILK

CAKE

GRAPES

BEANS

MEAT

End of Block: Memory task - shopping list

Start of Block: Recall - shopping list



Now try to write down as many of the items that you remember as possible

End of Block: Recall - shopping list

Start of Block: Memory task - nouns

You will now complete the same task again but this time with 15 unrelated items in exactly the same format as before.

READY TO BEGIN?

COT

CLOTH

GATE

NAP

WEAN

CRY

MILK

QUILT

SOFT

DOLL

SKIN

PLAY

ROCK

CUTE

Start of Block: Recall

Now try to write down as many of the items that you remember as possible

End of Block: Recall

Start of Block: Baby brain

It is important to me that I am not perceived to have 'baby brain' due to being pregnant/a mother

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

It is important to me that I remember things

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

- End of Block: Memory identification measure

- Start of Block: Baby brain

It is important to me that I am not perceived to have 'baby brain' due to being pregnant/a mother

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Finally, some questions about your perception of your looks. Please answer honestly, there are no right or wrong answers.

I often worry about whether the clothes I am wearing make me look good (6)

I rarely worry about how I look to other people. (8)

I am more concerned with what my body can do than how it looks (9)

End of Block: Body Consciousness Scale

Start of Block: Debrief

Thank you for participating in this study! I really appreciate you taking time to help me with this research.

Study background

In this work, I am testing 'Objectification theory', which suggests that women are socialised by society to view themselves as more object-like and less human (Fredrickson & Roberts, 1997). The objectification of women usually takes the form of sexual objectification, whereby women's value is emphasised only in relation to men as "sex objects" (Calogero, 2013).

Importantly, self-objectification has also been found to impair women's cognitive performance in lots of different research over the years (Fredrickson et al., 1998; Hebl et al., 2004; Gay and Castano, 2010; Gervais et al., 2011; Kahalon et al., 2018).

In this study, you may have been asked to complete a writing task about a sexually objectifying experience. I'm interested in whether reminders of sexual objectification can harm memory performance in pregnant women

and new mothers. This is part of my PhD work, which is interested in different explanations of the 'baby brain' stereotype.

Extra resources

Some extra reading on positive body image is here:

<https://www.nationaleatingdisorders.org/learn/general-information/ten-steps>

<https://www.sciencedirect.com/topics/medicine-and-dentistry/positive-body-image>

You can learn more about sexual objectification, if you're interested, here:

<https://www.apa.org/education/ce/sexual-objectification.pdf>

Any questions?

If you have any question about this study or the theories covered in this work, please feel free to email me M.V.Pownall@leeds.ac.uk

Thank you.

Appendix E. Study 7 materials

Information sheet

Thank you for considering participating in my research. It is advised that you complete this experiment in a time and place that is quiet and free from distractions. As a thank you for participating, you will have the option to be entered into a prize draw for 3x £30 Amazon vouchers. If you are completing this study on Prolific, you will be paid in exchange for your participation.

Please be advised that in this study you may be asked to recount experiences of sexual objectification. If you think this will be difficult for you, please do not progress with this study.

Who is the researcher?

Hello, my name is Madeleine Pownall and I am a PhD researcher in the School of Psychology at the University of Leeds. I am interested in how social mechanisms may account for differences in cognitive functioning, such as the memory task in this experiment. This work is supervised by Dr Russell Hutter and Professor Mark Conner, both at the University of Leeds. If you have any questions about this work or any of my PhD studies, please feel free to contact me on M.V.Pownall@leeds.ac.uk. This study has been approved by the School of Psychology Ethics Committee (Reference: PSYC-390).

Am I eligible to participate?

This work is interested in investigating the memory function pregnant women. Please note that to be eligible to participate, you must be above 18 years old and **currently pregnant**.

What will I be asked to do?

This online experiment, which will take approximately 5-10 minutes, can be completed in a time and place that is convenient to you. In the experiment, you will first answer a few demographic questions and then a short writing task (approximately 50 words). You will then be asked to complete two

different variations of a memory task. This will involve showing you a list of 15 different words that will flash up on the screen. You will then be redirected to a survey page that will ask you to list as many of the items as you can remember. This task will be repeated twice.

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous and later uploaded to the Open Science Framework to support publication of this research. We will store responses to the survey anonymously. Data will be stored securely in accordance with General Data Protection Regulation (GDPR) legislation and the British Psychological Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study

What will you do with my responses?

The results from this study will be published as a peer-reviewed journal article and may be presented at academic conferences. If you wish, you may contact the researcher for a copy of any research outputs derived from your participation in this experiment.

What if I have a question that hasn't yet been answered?

Please only continue with this experiment if you are happy that all of your questions have been answered, and you feel fully informed. When you feel ready, please complete the consent form below, indicating that you are fully informed as to the procedure of the experiment and you are happy to continue:

Consent form

- I have read and understood the information sheet (1)
- I consent to participate in this study (2)
- I understand that I am able to withdraw at any stage in the experiment (3)

If you are completing this study on Prolific, what is your Prolific ID?

Please enter your age

What is your ethnicity?

- Asian or Asian British (1)
 - Black or Black British (2)
 - Mixed (3)
 - White British (4)
 - Other ethnic group (including Chinese) (5)
-

What is your highest level of education?

- Doctoral degree (1)
 - Masters degree or equivalent (2)
 - Bachelor's degree or equivalent (3)
 - BTEC or equivalent (4)
 - A Levels, AS levels, or equivalent (5)
 - GCSEs or equivalent (6)
 - High school (7)
 - No qualification (8)
 - Other qualifications (9)
-

Are you currently in paid employment?

- Yes (1)
- No (2)

What is your current marital status?

- Married (1)
- Widowed (2)
- Divorced (3)
- Separated (4)
- Living with spouse (5)
- Never married (6)
- Civil Partnership (7)

End of Block: Demographics

Start of Block: Group allocation

Are you currently pregnant?

[if you answer 'no', you will be withdrawn from the study]

- Yes (1)
- No (2)

Are you over 18 years old?

[if you answer 'no', you will be withdrawn from the study]

- Yes (1)
- No (2)

End of Block: Group allocation

Start of Block: Pregnant

How far along in your pregnancy are you?

- First trimester (1)
- Second trimester (2)
- Third trimester (3)

Is this your first pregnancy?

- Yes (1)
- No (2)
- Prefer not to say (3)

End of Block: Pregnant

Writing task We're now going to ask you to complete a short writing task. It will only take a few minutes.

Start of Block: State self-objectification measure - experimental

Please take a moment to think about a time when you felt that somebody was sexually objectifying you. For example, somebody was gazing at you or evaluating you in a sexualized way, making sexual comments about your body, or whistling at you on the street, etc. Think about what took place—where you were, who you were with, how you felt, what you were thinking, and write about your experience in the space below.

Please aim to write at least 50 words. If you would rather not answer this question, you can withdraw by closing this browser to exit the survey.

End of Block: State self-objectification measure - experimental

Start of Block: Pregnancy objectification - experimental

Please take a moment to think about a time when you felt that somebody was objectifying you **during your pregnancy**. For example, somebody was gazing at you or evaluating you, making comments about your pregnant body, touching your bump, or providing unsolicited advice about your body while you were pregnant. This could also be a time where you felt like people were more interested in your bump than in you as a person. Think about what took place—where you were, who you were with, how you felt, what you were thinking, and write about your experiences in pregnancy in the space below.

Please aim to write at least 50 words. If you would rather not answer this question, you can withdraw by closing this browser to exit the survey.

End of Block: Pregnancy objectification - experimental

Start of Block: State self-objectification measure - control

Please write down a list of different colours (e.g. blue, green, red).

Please aim to write at least 50 words.

End of Block: State self-objectification measure - control

Start of Block: Memory task - shopping list

Now there are two short memory tasks.

For this first memory task, you will be shown supermarket shopping list items on the screen. After you have seen them, you will then be asked to write down all of the items you can remember seeing.

Please don't write down any of the items when they are shown to you - we're really interested in capturing your genuine responses to this task.

READY TO BEGIN?

BREAD

HAM

EGGS

RICE

OIL

JAM

FISH

SOUP

CHEESE

MILK

CAKE

GRAPES

BEANS

MEAT

End of Block: Memory task - shopping list

Start of Block: Recall - shopping list

Now try to write down as many of the items that you remember as possible

End of Block: Recall - shopping list

Start of Block: Memory task - nouns

Time for the second task! As before, you will now complete the same task again but this time with unrelated items in exactly the same format as before.

READY TO BEGIN?

COT

CLOTH

GATE
NAP
WEAN
CRY
MILK
QUILT
SOFT
DOLL
SKIN
PLAY
ROCK
CUTE

Start of Block: Recall

Now try to write down as many of the items that you remember as possible

Finally, some questions about your perception of your looks. Please answer honestly, there are no right or wrong answers.

	Strongl y disagree (1)	Moderatel y disagree (2)	Mildly disagree (3)	Mildl y agree (4)	Moderatel y agree (5)	Strongl y agree (6)
I rarely think about how I look (1)	•	•	•	•	•	•
I think it is more important that my clothes are comfortable than whether they look good on me. (2)	•	•	•	•	•	•
I rarely compare how I look with how other people look. (5)	•	•	•	•	•	•
During the day, I think about how I look many times. (3)	•	•	•	•	•	•
Select 'Strongly agree' for this item (7)	•	•	•	•	•	•

I often
worry
about
whether
the clothes
I am
wearing
make me
look good
(6)

• • • • • •

I rarely
worry
about how
I look to
other
people. (8)

• • • • • •

I am more
concerned
with what
my body
can do
than how it
looks (9)

• • • • • •

End of Block: Body Consciousness Scale

Start of Block: Debrief

Thank you for participating in this study! I really appreciate you taking time to help me with this research. If you are completing this study on Prolific, the completion code is **915FE3EF**.

Study background

In this work, I am testing 'Objectification theory', which suggests that women are socialised by society to view themselves as more object-like and less human (Fredrickson & Roberts, 1997). The objectification of women usually takes the form of sexual objectification, whereby women's value is emphasised only in relation to men as "sex objects" (Calogero, 2013).

Importantly, self-objectification has also been found to impair women's cognitive performance in lots of different research over the years (Fredrickson et al., 1998; Hebl et al., 2004; Gay and Castano, 2010; Gervais et al., 2011; Kahalon et al., 2018).

In this study, you may have been asked to complete a writing task about a

sexually objectifying experience. I'm interested in whether reminders of sexual objectification can harm memory performance in pregnant women and new mothers. This is part of my PhD work, which is interested in different explanations of the 'baby brain' stereotype.

Extra resources

Some extra reading on positive body image is here:

<https://www.nationaleatingdisorders.org/learn/general-information/ten-steps>

<https://www.sciencedirect.com/topics/medicine-and-dentistry/positive-body-image>

You can learn more about sexual objectification, if you're interested, here:

<https://www.apa.org/education/ce/sexual-objectification.pdf>

Any questions?

If you have any question about this study or the theories covered in this work, please feel free to email me M.V.Pownall@leeds.ac.uk

Please click 'next' if you would like to be entered into the prize draw.

Appendix F. Study 8 materials

Information sheet

Thank you for considering participating in my research. It is advised to complete this experiment in a time and place that is quiet and free from distractions. This study received ethical approval from the University of Leeds Ethics Committee on 8th April 2021 (Reference: PSYC-247).

Who is the researcher?

Hello, my name is Madeleine Pownall and I am a PhD researcher in the School of Psychology at the University of Leeds. I am interested in how social mechanisms may account for differences in the way we perceive other people. This work is supervised by Dr Russell Hutter and Professor Mark Conner, both at the University of Leeds. If you have any questions about this work or any of my PhD studies, please feel free to contact me on M.V.Pownall@leeds.ac.uk

Am I eligible to participate?

You are eligible to participate if are a) based in the US, b) over 18 years old.

What will I be asked to do?

This short online experiment, which will take approximately 5 minutes, can be completed in a time and place that is convenient to you. You will first answer a few demographic questions before being shown a very short (1 min 30 seconds) video. You will then be asked some questions about the person in the video.

Can I withdraw from the study?

Participation is completely voluntary. You may withdraw your data from the

study at any point by simply closing the online window. You do not have to answer any questions you do not want to and you do not have to provide any reason for withdrawing.

Will my taking part be kept confidential?

As the researchers, we will keep your information confidential. All information will be kept anonymous. We will store responses to the survey anonymously. Data will be stored securely in accordance with General Data Protection Regulation (GDPR) legislation and the British Psychological Society Code of Ethics. All information gathered will be stored on password-locked computer files. No data will be able to be linked back to any individual taking part in the study.

What will you do with my responses?

The data from this study will be stored confidentially for 6 years after completion. The results from this study will be published as a peer-reviewed journal article and may be presented at academic conferences. If you wish, you may contact the researcher for a copy of any research outputs derived from your participation in this experiment.

What if I have a question that hasn't yet been answered?

Please only continue with this experiment if you are happy that all of your questions have been answered, and you feel fully informed. When you feel ready, please complete the consent form below, indicating that you are fully informed as to the procedure of the experiment and you are happy to continue

Yes (1)

I have read and understood the information sheet (1)

I consent to participate in this study (2)

I consent to my anonymised responses to be made openly available by the research team (3)

End of Block: Information sheet

Start of Block: Demographics

Which gender do you most identify with?

- Male (1)
- Female (2)
- Non-binary (4)
- Other not listed (3)

What is your Prolific ID?

What is your age (in years)?

Choose one or more races that you consider yourself to be:

- White (1)
 - Black or African American (2)
 - American Indian or Alaska Native (3)
 - Asian (4)
 - Native Hawaiian or Pacific Islander (5)
 - Other (6)
-

Are you a parent?

- Yes (1)
- No (2)

End of Block: Demographics

Start of Block: Condition 1_Objectification

Objectification: You are about to view a short clip of woman on a television programme. Please focus on her **physical appearance** and the way her body looks in the clip.

Do you confirm that you understand what you have to focus on?

- Yes (1)

End of Block: Condition 1_Objectification

Start of Block: Condition 2_NoObjectification

No objectification: You are about to view a short clip of woman on a television programme. Please focus on her **performance** (i.e., her ability to do her job) in the clip.

Do you confirm that you understand what you have to focus on?

Yes (1)

End of Block: Condition 2_NoObjectification

Start of Block: Condition 1_pregnant

Condition 1_pregnant

Please watch this clip. You will not be able to progress until the clip is over. You can watch this full screen by clicking the square button on the bottom right. If you're on a mobile you can turn the screen to view this full screen.

Page Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

End of Block: Condition 1_pregnant

Start of Block: Condition 2_notpregnant

Condition 2_notpreg

Please watch this clip. You will not be able to progress until the clip is over. You can watch this full screen by clicking the square button on the bottom right. If you're on a mobile you can turn the screen to view this full screen.

Page Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

End of Block: Condition 2_notpregnant

Start of Block: Familiarity

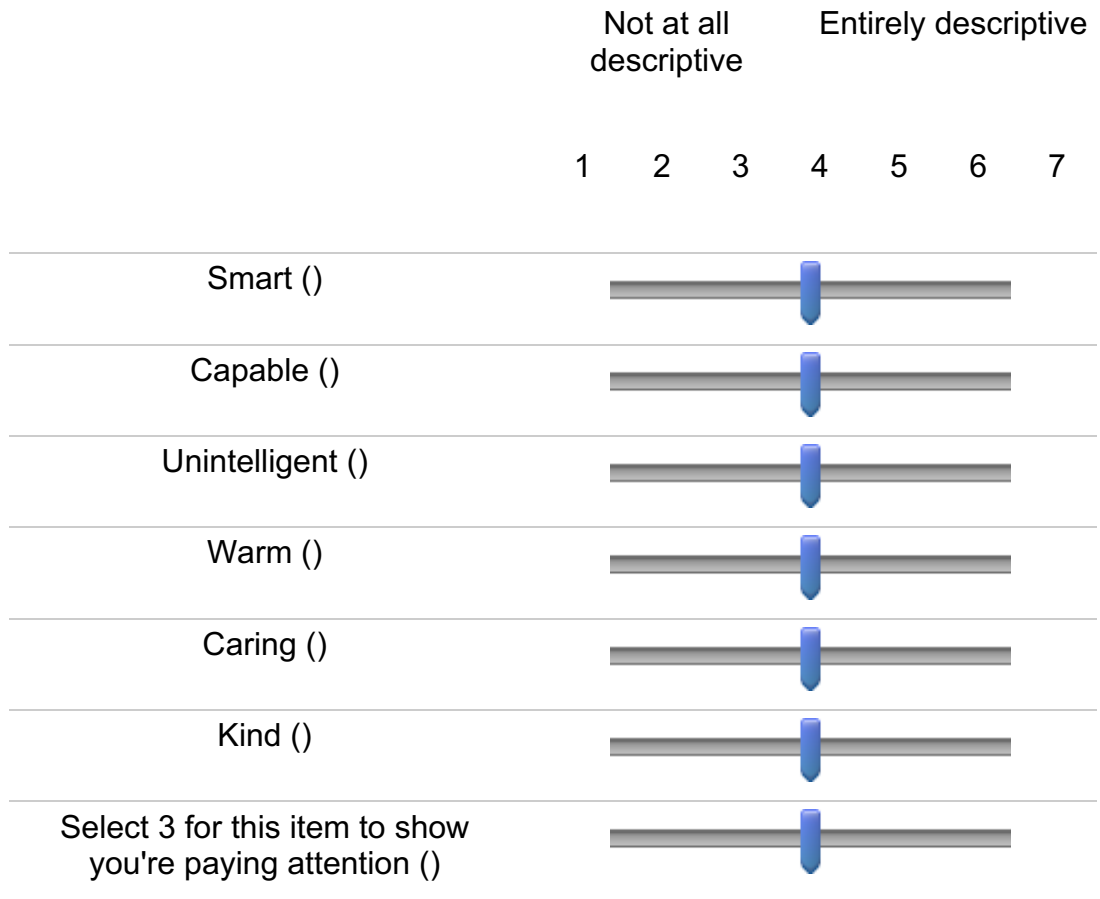
How familiar are you with the woman in the video clip?

- Not familiar at all (1)
- Slightly familiar (2)
- Moderately familiar (3)
- Very familiar (4)
- Extremely familiar (5)

End of Block: Familiarity

Start of Block: Perceptions questions

Perceptions question Below are a list of traits. Please identify the extent to which you think the woman in the clip is...



End of Block: Perceptions questions

Start of Block: Performance

How well do you think the woman in the clip performed at her job?

- Not well at all (1)
- Slightly well (2)
- Moderately well (3)
- Very well (4)
- Extremely well (5)

End of Block: Performance

Start of Block: Attentioncheck2

Was the woman in the clip you watched pregnant?

- Yes (1)
- No (2)

End of Block: Attentioncheck2

Start of Block: Manipulationcheck

When you watched the video clip, did you focus more on the woman's appearance or performance?

- I mostly focused on her appearance (1)
- I mostly focused on her performance (2)

End of Block: Manipulationcheck

Start of Block: Liking respect

I like the woman in the video clip

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

- Respect I respect the woman in the video clip
- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: Liking respect

Start of Block: Debrief

Debrief Thank you very much for completing this study! In this study, you will have been shown a video of a UK gameshow host, who was either visibly pregnant or not. You were then asked to rate this individual on traits including warmth and competence. This study aimed to test whether people generally stereotype pregnant women to be less competent, more warm, and less moral, compared with other groups of women. This effect has been found in some published studies, for example:

<https://psycnet.apa.org/record/2007-16921-003>

<https://www.sciencedirect.com/science/article/pii/S002210311000288>

We also asked about your familiarity with the woman in the video, because this has been found to affect our perceptions of other people too. This study is part of my PhD research which broadly aims to investigate how pregnant women are stereotyped in relation to other social groups.

If you have any questions, or you would like a copy of this study's write-up when it is ready, please feel free to contact me via
M.V.Pownall@leeds.ac.uk

End of Block: Debrief
