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**Responses to Ethnic Diversity for Ethnic Majority Members:
Effects on Self-Regulation, Values and Epistemic Needs**

By:

Marcel Wiechmann

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Department of Psychology

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ABSTRACT

Ethnic diversity has reached unprecedented levels in Western societies, and it is expected to increase even further (Coleman, 2013). Diversity creates complex combinations of social categorisation which, in turn, create cognitive challenges for members of both majority and minority groups. However, as people engage with ethnic diversity on a regular basis they might develop the cognitive skills needed to overcome these challenges (Crisp & Turner, 2011). This thesis reports a research program that investigated the processes underlying this cognitive response to diversity. As a first step, I investigated whether experiencing ethnic diversity would lead to enhanced self-regulation. Living in an ethnically diverse environment might frequently require the suppression of stereotypical information, and stereotype inhibition can be considered an act of self-regulation. Studies 1-3 investigated the influence of diversity experiences of White British participants on impulsiveness, delay of gratification and Stroop performance. In general, findings revealed that experiences of diversity affected self-regulation only when diversity was first made salient. However, contrary to predictions, participants with more experiences of diversity showed *impaired* rather than enhanced self-regulation when diversity was made salient. Integrating these findings with the existing literature suggested that individuals respond to diversity not by developing enhanced cognitive inhibition, but instead by acquiring a mindset characterised by a low reliance on rules and categorical thinking. This hypothesis was supported by the remaining studies in this thesis: Participants who had experienced frequent positive contact were less likely to rely on rules, conventional values and social conformity (Studies 4-6). Further studies showed that frequent positive contact was also associated with a low need for cognitive closure (Study 7a and 7b) and a low need for personal structure (Study 8). These findings indicate that participants who have experienced more diversity felt a low need to enforce structure

by simplifying information through the use of categorical thinking. This thesis offers a novel perspective on research on the cognitive impact of diversity by exploring the everyday experiences of diversity for ethnic majority members. Furthermore, it offers a novel attempt to specify the underlying cognitive mechanisms responsible for the enhanced cognitive flexibility observed among individuals who have experienced higher levels of social diversity.

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DECLARATION

I hereby declare that the contents of this thesis are my original work. Intellectual debts are acknowledged in the text. The work included in this thesis has not been submitted for any other degree or any other university.

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CHAPTER 1: INTRODUCTION AND OVERVIEW

Growing ethnic diversity in Western societies leads to various challenges for all members of society and demands adaptation to be appropriately handled. Some of these challenges concern cognitive processes and managing them requires cognitive adaptation. In this chapter, I introduce the debate on ethnic diversity and its cognitive consequences. I will then describe the aims of this thesis: a) specify and measure the cognitive processes involved in responses to diversity, and b) study the impact of diversity for majority members. Finally, I will offer a brief overview of the thesis.

1.1 The Rise of Ethnic & Cultural Diversity

Ethnic diversity is not a new feature of human societies: Through history, migration has led to societies with varying degrees of interethnic interaction (Smedley, 1998). However, the scale and scope of ethnic and cultural diversity in Western societies today is unprecedented, as is its rate of growth (Coleman, 2013; Riche, 2000). Since the end of the Second World War in 1945, virtually all highly developed countries have faced large-scale immigration, a trend that has intensified to this day (Castles, 1995). The result has been an unparalleled cultural and ethnic heterogeneity in developed countries (Plaut, 2010a).

This means that the social environments face massive changes in their ethnic composition, which is well illustrated by demographic projections for the USA and UK: The proportion of White Caucasians is projected to fall below 50 percent by 2044 in the USA and by 2066 in the UK (Colby & Ortman, 2015; Coleman, 2010). Similar projections have been made for other European countries: Luxembourg, Cyprus and Austria are expected to have a population share of over 50 percent of citizens with a foreign

background by 2061 (Lanzieri, 2011). The European Union as a whole is projected to have a population share of 23 percent with foreign background by 2031 and 35 percent by 2061 (Lanzieri, 2011). This means that within a few decades a major share of interactions will be between members of different ethnic groups, even for the ethnic majority. This scenario is already foreshadowed in some states in the USA (Hawaii, California, New Mexico and Texas; United States Census Bureau, 2012) and some metropolitan centres in Europe such as London, Amsterdam and Brussels where the largest ethnic group consists of less than 50 percent of the population (Crul, 2016; White, 2012). As ethnic and cultural diversity is expected to rise even further in the following decades (Coleman, 2013; Lanzieri, 2011) the importance of understanding its impact increases as well.

Consequently, how to evaluate and react to this increase in ethnic diversity has been a matter of heated debate among policy-makers that continues to this day (Kymlicka, 2010; Plaut, 2010a; Triandafyllidou, 2011). The impact of ethnic diversity on human societies and individuals has also been a key interest for researchers in various fields such as sociology (e.g. Alba, 1999; Hartmann & Gerteis, 2005; Tiryakian, 2003), political science (e.g. Putnam, 2007), urban planning (e.g. Talen, 2006; Uitermark, Rossi, & Van Houtum, 2005), economy (e.g. Alesina & Ferrara, 2005; Bellini, Ottaviano, Pinelli, & Prarolo, 2013), educational science (e.g. Banks, 1993; Milem, 2003) and psychology (Markus, 2008). Issues of ethnic diversity have been a topic of interest since the early days of social psychology, even though research interest has initially been focussed on prejudice and bias in intergroup behaviour (e.g. Allport, 1954; Bogardus, 1926; see Duckitt, 1992 for an overview). Research has since expanded considerably and explored the cognitive and affective basis of intergroup bias, as well as means to reduce it (Brown & Hewstone, 2005; Dovidio & Gaertner, 2010). However, living in an ethnically

heterogeneous environment does not just mean managing potential animosities between different ethnic groups. Recent research has emphasized that ethnic diversity introduces complexity to social identities and environments and that having to manage this complexity on a regular basis might have substantial impact on individuals' cognitive skills and functions (Crisp & Turner, 2011; Tadmor, Tetlock, & Peng, 2009).

Thus, understanding and managing the impact of diversity also involves knowledge of how diversity might affect people's psychological makeup. Such an understanding should also make it possible to identify areas in which experiences with diversity can be a key advantage. Experiences of diversity should lead to the development of skills and strategies to more efficiently deal with diversity. Such skills might have important benefits domains outside the intergroup domain. For example, beneficial effects of diversity have already been clearly demonstrated for creative performance (Leung & Chiu, 2010; Maddux, Adam, & Galinsky, 2010; Maddux & Galinsky, 2009; Steffens, Gocłowska, Cruwys, & Galinsky, 2015; Tadmor, Hong, Chao, Wiruchnipawan, & Wang, 2012).

1.2 Aims of the Thesis

This thesis investigates how members of the Ethnic majority respond to the experiences of diversity that result from living in ethnically heterogeneous neighbourhoods. This investigation applies the Categorization-Processing-Adaptation-Generalization (CPAG) model (Crisp & Turner, 2011) as a theoretical framework to understand the cognitive responses of majority members to prolonged experiences of diversity. This approach aims to address two key issues regarding responses to diversity: a) the need to specify and measure the cognitive processes involved in responding to diversity, and b) study the impact of diversity for majority members.

The CPAG model offers an extensive theoretical framework for understanding how individuals adapt to the challenges of social diversity. According to the CPAG model, repeated experiences of diversity can lead to cognitive adaptation if they are cognitively challenging – as long as they challenge existing stereotypical knowledge. In this case experiences of diversity can instigate an adaptation process that results in enhanced cognitive flexibility. There is extensive empirical evidence supporting the idea that diversity can promote cognitive flexibility and divergent thinking (Gutierrez & Sameroff, 2008; Leung & Chiu, 2010; Leung, Maddux, Galinsky, & Chiu, 2008; Maddux et al., 2010; Tadmor, Hong, et al., 2012), but there is little research on the exact processes that enable this improvement. The superior cognitive flexibility observed among individuals who have experience a lot of diversity is assumed to be the result of efficiency in inhibiting stereotypical content, leaving more cognitive resources for generative thought. While this idea is grounded in empirical findings on how people process socially diverse stimuli (Hutter & Crisp, 2006; Macrae, Bodenhausen, Schloerscheidt, & Milne, 1999), there is a lack of empirical evidence that this is how people actually respond to *prolonged* experiences of diversity. This thesis therefore attempts to examine the specific processes that are affected by prolonged experiences of diversity.

Furthermore, research on the impact of prolonged experiences has so far been focussed on either the effects of managing the influence of two or more cultures for ethnic minority members (also called biculturalism, e.g. Cheng, Sanchez-Burks, & Lee, 2008; Saad, Damian, Benet-Martínez, Moons, & Robins, 2013) or on the influence of experiencing diversity abroad (e.g. Godart, Maddux, Shipilov, & Galinsky, 2015; Hellmanzik, 2013; Maddux et al., 2010; Maddux & Galinsky, 2009). This research has been invaluable to understand the general response patterns to diversity. However, there is a need for more research to generalise these findings to other forms of experiences of

diversity which might be more common than biculturalism or time abroad. The way in which biculturals experience diversity might not be comparable to the sort of experiences majority members make, and most people will spend only a minor part of their time abroad. However, as ethnic diversity rises experiences of diversity will become a common part of everyday life for majority members as well. Simply living in an area that is ethnically diverse should be a source of diversity experiences that is common to a large part of society. Studying and understanding the impact of such everyday experiences of diversity for majority members should thus be an important part of understanding how diversity might lead to cognitive adaptation.

1.3 Overview

In this thesis, I will begin with a review of the literature on social diversity and its impact on cognition and beliefs. I will then integrate this literature with research on self-regulation and stereotype suppression to highlight the potential role of cognitive inhibition in adapting to ethnic diversity. Subsequently, I will present three studies that test the impact of diversity on self-regulation. Considering the findings obtained from these studies I will suggest a revision of the initial theoretical framework which will be tested in six further studies. I will then discuss the implications of the findings from these studies under consideration of the current research findings.

Chapter 2 offers a review of the current literature on the long-term effects of diversity on cognition. In this chapter, I will argue that the cognitive challenges emerging from social diversity can be generally understood as conflicts of categorical information. Consequently, adaptations to diversity should make handling conflicting information more efficient. Drawing from the CPAG model I will argue that this is achieved by enhanced cognitive flexibility among individuals who have experienced a lot of diversity. The CPAG model assumes that this is the result of superior cognitive inhibition, but I will

argue that there is need for more thorough research on whether diversity does indeed affect self-regulatory ability.

Chapter 3 provides a more in-depth review of the literature on stereotype inhibition and self-regulation. In this chapter, I will argue that controlling stereotypes calls on the same processes and resources as other acts of self-regulation (social and non-social). This argument is supported from behavioural and neurological studies investigating stereotype suppression in intergroup interactions. Furthermore, the idea that stereotype inhibition engages self-regulatory ability is also supported by research on the control of intergroup bias when making social judgements. Thus, individuals living in ethnically diverse environments are likely to frequently engage in stereotype inhibition to make intergroup interaction and social judgements more efficient. To explore potential consequences of such frequent acts of self-regulation, I will also discuss research on the effect of self-regulation training. Current findings suggest that frequently engaging in self-regulation can have long-term benefits for self-regulatory ability even for unrelated tasks. Frequent acts of self-regulation, such as frequent stereotype inhibition, might lead to improved cognitive inhibition in general. In other words, individuals with a lot of experience with diversity should tend to demonstrate superior self-regulatory ability. This idea is further investigated in three studies reported in Chapter 4.

Chapter 4 reports three studies which investigate the link between experiences of diversity of majority members and self-regulatory ability. More specifically, these studies tested the prediction that White British participants who were exposed to a high degree of diversity would display superior self-regulation. While diversity did indeed affect self-regulation, the effect was in reversal to the predicted pattern. Participants who report more experience with diversity tended to report high impulsiveness as well as a weaker ability to delay gratification (Study 1 and 2), and showed inferior inhibitory performance on the

Stroop test (Study 3). However, these effects seem to be moderated by the salience of diversity (Study 2 and 3) in the sense that experiences of diversity only affected self-regulation when diversity was made salient. In other words, self-regulation was only affected by diversity when participants were cued to expect socially diverse stimuli. Together these findings indicate that the salience of diversity might activate a mindset for participants with diversity experience, and this mindset seems to temporarily impair performance on cognitive control tasks. The question why such a mindset should be activated in the first place and why it would be associated with low performance on self-regulatory tasks is further explored in Chapter 5.

Chapter 5 revisits the theoretical framework developed in Chapter 2 and 3 and revises it under consideration of the findings reported in Chapter 4. In this chapter, I revisit the CPAG model and offer a more in-depth review of the empirical evidence for increased cognitive flexibility after prolonged exposure to diversity and integrate it with findings from Studies 1-3. In these studies, participants with diversity experience reported decreased self-regulation when diversity was salient. The salience of diversity also caused poor performance on a cognitive control task for these participants. Such weak performance on self-regulatory tasks and the decrease in self-reported self-regulation could be caused by changes in ability or motivation. That is, what appears to be impaired self-regulation could be caused either by a temporarily weakened inhibitory ability or a lowered motivation to monitor cognitive rules. The available research suggests that making diversity salient might lead to a decreased need for cognitive rules for participants with diversity experience. This motivational change might be responsible for improved cognitive flexibility commonly observed among individuals who have experienced a lot of diversity, but it might also have affected self-regulatory performance in Studies 1-3. Generally speaking, the experimental conditions that led to decreased self-regulatory

performance in Studies 1-3 have also been associated with divergent thinking and cognitive flexibility. This suggests that the increase in cognitive flexibility observed for individuals with diversity experience is not achieved via enhanced self-regulatory ability. However, research on need for cognitive closure (NFCC) also suggests that being very flexible when it comes to following categories and rigid rules can be detrimental for self-regulation, since self-regulation might sometimes require following clear and specific rules. Thus, enhanced cognitive flexibility might be achieved not through improved self-regulatory ability, but rather by taking a relatively flexible stance towards categorical rules. This motivational tendency would be beneficial for resolving categorical conflicts, but also produce suboptimal performance when monitoring specific self-regulatory goals as the motivation to focus attention on these goals would be low. This idea is expanded upon in a suggested revision of the CPAG model which integrates the literature on adaptation to diversity with findings on cognitive flexibility and cognitive control and results from Studies 1-3. In this revised framework, it is assumed that prolonged experiences of diversity lead to superior cognitive flexibility by acquiring a mindset with a weak reliance on categorical rules and weak boundaries between cognitive categories. This tendency towards a low reliance on rules should also generalise to different types of categorical rules such as social norms. These ideas are empirically tested in Chapter 6 and 7.

Chapter 6 and *7* investigate the impact of prolonged experiences of diversity on the reliance on categorical rules for White British participants. In *Chapter 6*, I report three studies which explore whether diversity is linked to a generalised low reliance on rules, affecting the dependence on social norms. Findings revealed that participants with frequent positive interethnic contact display a low reliance on rules in general (Study 5 and 6), as well as a low reliance on conformity (Study 4) and conventional norms (Study

5). Participants with frequent positive contact also reported a low willingness to submit to authority (Study 6). In *Chapter 7*, I present three studies that test the hypothesis that diversity is associated with low epistemic needs to enforce structure by employing categorical thinking. Prolonged experiences of diversity in the form of frequent positive contact predicted low need for cognitive closure (Study 7a and 7b) and low need for personal structure (Study 8). These and other findings presented in this thesis are finally reviewed in Chapter 8.

Chapter 8 summarises the key findings of this work, and discusses their theoretical implications as well as their limitations. I make some suggestions for possible avenues for future research to advance the understanding of the nature and scope of cognitive change in response to diversity.

CHAPTER 2: THE COGNITIVE CHALLENGE OF ETHNIC DIVERSITY

The cultural diversity of today's world is unprecedented, and it is expected to increase even more in the following decades (Coleman, 2013). With diversity on the rise, individuals have to learn how to make sense of the increasing complexity in their social identity and environment (Roccas & Brewer, 2002). However, it has been suggested that individuals who repeatedly experience diversity should over time improve the cognitive skills necessary to efficiently handle such complex environments (Crisp & Meleady, 2012; Crisp & Turner, 2011). Such cognitive adaptation might prove useful not only for diverse environments but in a wide range of other unrelated domains. In this chapter, I will review research that highlights how social diversity can affect cognition and beliefs and sketch how this might lead to long-term adaptation affecting domains beyond diversity.

Social diversity is a broad concept, but generally describes the degree of difference among members of a group. It can be defined as the variations of personal attributes within a group (Martín-Alcázar, Romero-Fernández, & Sánchez-Gardey, 2011; Pelled, Eisenhardt, & Xin, 1999), as long as these variations are considered to be meaningful (Plaut, 2010b; van Knippenberg, De Dreu, & Homan, 2004). That is, social diversity refers to the amount of variety in social categories. Diversity comes in many varieties such as diversity in age, religion or ethnicity. In this work, I will use ethnic diversity as a lens to investigate the impact of social diversity.

Ethnic diversity has proven to be an especially powerful attribute for perceiving differences: Categorisation of ethnicity occurs fast, automatic and effortless (Fazio & Dunton, 1997; Ito & Urland, 2003). This is partly due to the fact that categorisation on the ethnic domain can be made through visual signifiers (whether these are accurate or

not; Bar-Haim, Saidel, & Yovel, 2009; MacLin & MacLin, 2011), while categorisation on other domains such as education or occupation requires further inquiry. This probably has made ethnic categorization particularly useful for evolved mechanisms of coalition detection (Cosmides, Tooby, & Kurzban, 2003; Kurzban, Tooby, & Cosmides, 2001).

Regardless of this focus on ethnic diversity, I want to emphasise that the impact of other forms of social diversity should be similar in principle and work through similar processes. Furthermore, it is not only ethnic or cultural diversity that is on the rise in our societies, but Western societies are experiencing a diversification of social roles in many other domains such as gender (Giele & Holst, 2003; Smits, Mulder, & Hooimeijer, 2003), age (Riley & Riley, 1994, 1989), sexuality (Cohler & Hammack, 2007), and occupations (R. H. Turner, 1990; Wroblewski & Huston, 1987). I will return to this point when I am discussing the wider implications of my findings in Chapter 8.

2.1 The Cognitive Challenges of Diversity

The increasing diversity of the social environment leads to a multitude of challenges and opportunities, as illustrated by the lively debate on how to manage social diversity (Kymlicka, 2010; Plaut, 2010a; Triandafyllidou, 2011). Various fields have contributed to this debate, and psychology is no exception. Social psychology has traditionally focussed on understanding prejudice and conflicts in intergroup behaviour (see Duckitt, 1992 for an overview). However, psychological research on diversity has considerably expanded since then, and some researchers have shed light on the different types of cognitive challenges that emerge from living in an ethnically diverse environment.

In particular, studies have explored the cognitive challenges of immigrants who face the difficult task of integrating different cultural identities into one coherent whole (Gołowska & Crisp, 2014; Nguyen & Benet-Martínez, 2007). Similarly, observers of

diverse environments are also facing cognitive challenges, such as making sense of individuals with diverse, cross-cutting identities which requires resolving contradictions between social categories (Hutter & Crisp, 2005; Roccas & Brewer, 2002).

A common theme in these areas of research is that diversity can be cognitively challenging, because it produces experiences that are conflicting with existing categorical knowledge (Crisp & Turner, 2011). Categorical knowledge is something we heavily rely on to understand our social environment: Social identities inform us about our place in the world (Hogg, Hohman, & Rivera, 2008; Tajfel & Turner, 1986), and stereotypes give us guidelines when we try to understand other people (McGarty, Yzerbyt, & Spears, 2004). In a diverse society however, social categories are fluid and interwoven, so their boundaries are more likely to be called into question (Hutter & Crisp, 2005), leading to challenges for categorical thinking for all members of a diverse society. But research also indicates that these demanding features of diversity might encourage people to develop cognitive strategies to overcome the cognitive challenge posed by them (Crisp & Meleady, 2012; Crisp & Turner, 2011). This would also explain the known benefits diversity beyond intergroup relations, such as improved creative performance (Gocłowska & Crisp, 2014; Leung & Chiu, 2010; Leung et al., 2008).

These cognitive challenges resulting from ethnic diversity will be discussed in further detail below. Based on this, I will then elaborate on the cognitive processes that might be involved in handling these challenges. Subsequently I will discuss how employing these processes frequently could lead to cognitive adaptation to ethnic diversity.

2.1.1 Challenges for Immigrants

The behavioural and cognitive challenge of diversity is probably most apparent for immigrants, who have to resolve conflicts between the identities of their original

culture and their new host nation (Berry, 1997). Immigrants find themselves in a social environment in which they are members of a non-dominant group and have to come to terms with the new dominant culture of the larger society they are now a member of. The process through which culturally non-dominant members of society adapt to the dominant culture has been termed acculturation (Berry, 2009). Acculturation has originally been understood in terms of learning and unlearning behaviour patterns to adapt to the new cultural environment (Berry, 1997). Subsequent research, however, has emphasized that acculturation does also include cognitive adaptation. Of particular importance here is how non-dominant members of society define their cultural identity (Benet-Martínez & Haritatos, 2005; Benet-Martinez, Leu, Lee, & Morris, 2002; Sam & Berry, 2010). Non-dominant members of society must decide how to incorporate the cultural identity of their host society with the identity of their original culture. The challenge herein lies in the fact that these identities might intersect and overlap, with potentially contradicting aspects (Mok & Morris, 2012; Tadmor et al., 2009).

The experience of difficulties during acculturation are referred to as acculturative stress (Berry & Annis, 1974). Acculturative stress can take the form of an increased risk for psychopathology (Berry, 1997; Krishnan & Berry, 1992; Zhang & Goodson, 2011), as well as an increased chance to have experiences of discrimination (Benet-Martínez & Haritatos, 2005). However, acculturative stress is not an inevitable experience during acculturation. If acculturative stress is experienced and to what degree is determined by several factors (Krishnan & Berry, 1992), a major one being the manner in which the immigrant approach the challenge of acculturation (Berry, 1997).

Acculturation strategies. Exactly how individuals acculturate can be described by four possible acculturation strategies, originally proposed by Berry (2009). These

strategies differ in the extent to which individuals strive to maintain their original culture and to the extent they engage with the dominant culture of the larger society.

One possible strategy is to simply outright reject both the host nation's as well as one's own original cultural identity. In this case the individual is said to have marginalized. Another option is assimilation, abandoning one's original culture and fully embracing the dominant culture. Individuals can also choose separation. In this case they reject the dominant culture, but maintain one's original culture. Individuals who manage to maintain their original culture, but also successfully engage with the new dominant culture have achieved integration. Which one of these strategies is chosen will depend on the person's motivation and ability.

Marginalization has been found to be generally the least adaptive in the sense that it leads to the highest levels of acculturative stress. The best protection from acculturative stress is offered by integration. Separation and assimilation tend to perform somewhere between integration and marginalisation (Berry, 1997). While integration has been shown the most effective in preventing acculturative stress, this strategy might also be the most challenging. Individuals who want to successfully integrate must incorporate their different cultural identities into a coherent whole. This means resolving all potential conflicts between the different social identities, conflicts which can occur on the cognitive, behavioural or affective level (J. C. Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).

Consider the case of a Chinese immigrant coming to the United Kingdom. Conflicts of behavioural scripts will appear, for example for conversational norms: Even though British culture is considered to favour relatively indirect forms of communication for Western standards (Djussa, 1994; Dunkerley & Robinson, 2002), Western norms just differ so drastically from Chinese culture that typical British communication is likely to be experienced as aggressive and rude (Durkin, 2011).

Underlying these behavioural conflicts are also attitudes, beliefs and feelings about the appropriate forms of social interactions, the role of social hierarchy, the importance of maintaining social harmony, etc. (Gabrenya, Jr., & Hwang, 1996; Schwartz, 1999). Conflicts such as these will have to be resolved for the person to achieve an integration of social identities. This requires creating a more complex identity structure in which any potential conflicts between different identities have to be resolved (Gocłowska & Crisp, 2014; Tadmor et al., 2009).

Acculturation as a conflict of categorical information. The conflict of social identities and behavioural patterns could be more broadly summarised as a conflict of categorical information (Gocłowska & Crisp, 2014): Cultural identities are a form of social category which give people a sense of who they are, and how they are different from others (Tajfel & Turner, 1979). These social categories are also typically associated with sets of behavioural, cognitive and affective schemas which give people a rough guideline of how to think, feel and behave as a member of their group (J. C. Turner et al., 1987).

These aspects of social identities give people a sense of certainty in a complex world precisely because they are categorical, and hence reduce complexity (Forgas, Tajifel, & Forgas, 1981). Integrating two different cultural identities therefore demands resolving potential conflicts in categorical information. This means not only incorporating complex information on their identity ('Who am I?'), but also conflicting affective, cognitive and behavioural norms ('How should I feel, think and behave as a concurrent member of these different groups?').

The need to resolve conflicts between categorical information is the unifying feature of dealing with challenging diversity not just for ethnic minority members (such

as immigrants), but in fact every member of an ethnically diverse society, including majority members, as I will demonstrate in the next section.

2.1.2 Challenges for Dominant Members of a Diverse Society

Immigrants are not the only members of society facing the need for adaptation to diversity. Having to manage two cultural identities is a difficult task but understanding diverse environments can be a challenge in itself. Everyone living in a socially diverse society must deal with the task of making sense of their social environment, and this includes members of the dominant culture (usually the culture of the majority) as well.

Perceiving and interpreting a socially diverse environment will demand cognitive adaptation, because diversity increases the complexity of social environments: A culturally diverse society is by definition more heterogeneous, and therefore has many members that do not exclusively belong to the dominant culture (individuals with migration backgrounds or parents from mixed cultures, expats, etc.). As described in the previous section, some of these individuals will choose to integrate their different behavioural scripts and cultural identities. As a result, a diverse society will have more members with complex identities. Consequently, social identities have been shown to be more complex in neighbourhoods which are high in ethnic diversity (Schmid, Hewstone, & Ramiah, 2013).

Individuals with complex identities will be perceived to have distinct and orthogonal social identities which will not neatly map onto a common social category (Roccas & Brewer, 2002). Forming an impression of such individuals will be more challenging and effortful as different pieces of categorical information will be in contradiction with each other. When a combination of social categories seems contradicting and therefore surprising (e.g. female mechanic, Black CEO), impression formation can no longer rely on readily accessible stereotypical information (Hutter &

Crisp, 2005; Kunda, Miller, & Claire, 1990). The perceiver instead must ascribe emergent attributes to the person in question. Emergent attributes are characteristics which are not typically ascribed to any of the simple categories in isolation. They are rather generated by causal reasoning about how a person could be a member of these seemingly contradicting social categories. Forming an impression of surprising category combinations has been found to take more time and effort than for unsurprising ones (Hutter, Crisp, Humphreys, Waters, & Moffitt, 2009).

To sum up this section, understanding individuals with complex, cross-cutting social identities is usually cognitively taxing and requires effortful processing. Culturally diverse environments have a high density of individuals with complex identities, and are therefore more challenging to make sense of, even for members belonging only to the dominant culture. The challenge consists in making sense of individuals that belong to different social categories that are seemingly at odds with each other. In other words, social perceivers in a diverse environment must also actively resolve conflicts of categorical information.

2.2 Diversity Requires Resolving Categorical Inconsistencies

Living in a diverse environment poses a psychological challenge. As laid out above, a major part of that challenge is that diversity requires resolving categorical inconsistencies: Diverse societies will have a higher density of individuals with multiple, cross-cutting identities. Constructing a coherent sense of identity will require resolving potential conflicts between the different identities. The resulting social identities will be more complex and will make a diverse environment challenging to understand and predict. Making sense of the social world usually relies on stereotypical knowledge as it makes the process fast and efficient (McGarty et al., 2004). However, with many complex social identities this heuristic process becomes less useful. People with complex identities are

likely to contradict stereotypical expectations, because their social identity emerges from a complex integration of seemingly contradicting social categories. Social observers will therefore also be faced with the task to understand just how these persons have managed to overcome these categorical inconsistencies, requiring them to resolve these inconsistencies themselves.

Challenging experiences of diversity can take many different forms, but a common theme for all of them is the need to resolve categorical inconsistencies. At its psychological core, social diversity is about the coexistence and combinations of multiple social categories. Managing the resulting complexities will often require resolving conflicts between the multitudes of category combinations.

2.3 How Are Conflicts Between Social Categories Resolved?

Thinking about identity and the social environment in terms of social categories is the default mechanism for most people (McGarty, 1999), and has likely evolved to quickly recognise friend from foe (Cosmides et al., 2003; Crisp & Meleady, 2012; Kurzban et al., 2001). Understanding the world in terms of ingroups and outgroup ('us' versus 'them') has been shown to be a major cognitive mechanism, and can be demonstrated even with meaningless ('minimal') artificial groups (Tajfel, Billig, Bundy, & Flament, 1971).

We should therefore expect managing the conflicting contents of social categories to be a serious psychological challenge. However, while the scale of current social diversity might be unprecedented, socially complex environments are hardly a novelty to the human race (Crisp & Meleady, 2012; Dunbar & Shultz, 2007). It has therefore been argued that we must possess the cognitive ability to adapt to diverse environments (Crisp & Meleady, 2012). To assure survival it must have been necessary to build coalitions with other groups and to be able to understand the increasing complexity of human societies.

Furthermore, some individuals clearly *do* succeed in adapting to socially diverse information: Biculturals can demonstrate successful integration of social identities from different cultural background (Benet-Martínez & Haritatos, 2005), and observers of surprising category combination (e.g. female mechanic) in laboratory studies are able to make sense of a person without relying on readily accessible stereotypical information (Hutter & Crisp, 2005). For such displays of adaptation to social diversity, resolving conflicts between social categories has to be a prerequisite, because inconsistencies between categories are an integral part of social diversity (Crisp & Turner, 2011).

If resolving categorical inconsistencies is a crucial part of living in diverse environment, just how do people do this? Some observations on how people deal with and handle conflicts of social categories come from studies that present participants with counterstereotypical combinations.

When people encounter a person with a surprising combination of social categories (e.g. a feminist bank teller, Kunda et al., 1990) they face a conundrum – just how does this person happen to have these seemingly contradicting social identities at the same time? Research has revealed that such contradictions are resolved by engaging into causal reasoning and generating emergent attributes (Hastie, Schroeder, & Weber, 1990; Kunda et al., 1990). An emergent attribute is a characteristic that is ascribed to a category combination even though it is not usually associated to any of the single categories. It is therefore an emergent property of the specific combination of social categories. Such emergent attributes are generated more frequently when the combination of categories seem incongruent and therefore surprising (Hastie et al., 1990; Kunda et al., 1990), and are generated by a process of causal reasoning (Kunda et al., 1990). Unexpected category combinations do not only lead to the generation of more emergent attributes, they also lead to the generation of less constituent attributes (attributes commonly associated with

one of the single categories; Hutter & Crisp, 2005). This has been taken as evidence for the inhibition of constituent properties being part of the underlying process to resolve categorical inconsistencies.

If resolving categorical conflicts does require cognitive inhibition it should also be an effortful process, and hence be impaired under cognitive load. This does indeed seem to be the case: Cognitive load eliminates the recollective advantage of counterstereotypical attributes (Macrae et al., 1999), indicating that participants were impaired in their inconsistency resolution and were therefore unable to organize counterstereotypical memories. In a different study, participants under cognitive load were found to generate less emergent attributes in response to unexpected combinations of social categories (Hutter & Crisp, 2006). This is again indicating that categorical inconsistencies require cognitive resources to be properly processed. Furthermore, participants presented with surprising category combinations respond slower to constituent attributes, indicating that stereotypical information is indeed inhibited when processing categorical inconsistencies.

To summarise, there is substantial evidence to suggest that participants presented with counterstereotypical combinations resolve this categorical inconsistency by a) inhibiting the stereotypical information that does not fit the category combination and b) generate emergent attributes that diverge from the conventional characteristics ascribed to the separate categories.

Based on these observations, the Categorisation-Processing-Adaptation-Generalisation (CPAG) model (Crisp & Turner, 2011) suggested that resolving conflicts of social categories is a two-step process: Individuals first have to inhibit the conflicting stereotypical knowledge. Once stereotypes are suppressed, the conflict can be resolved

by employing generative, divergent thought. Both steps are assumed to require effortful elaboration, necessitating a switch away from heuristic processing.

Making such shifts towards a more analytical and less heuristic mode of processing will be crucial to navigate socially diverse environments, in which categorical inconsistencies are common. According to the CPAG model, these adjustments in processing should become easier with repeated experiences of diversity (Crisp & Turner, 2011). However, for experiences of diversity to trigger cognitive change, they need to challenge existing stereotypical knowledge, and the perceiver must be able and motivated to resolve the inconsistency. If a person continuously engages in sense-making of challenging cases of diversity they eventually adapt and become more efficient in handling diversity. They gain the ability to apply and modify categorical knowledge in a flexible, non-rigid way and to effortlessly switch to an individualised mode of impression formation when necessary.

The idea that experiences of diversity lead to more competence in processing diversity in the future has substantial support: Exposure to a multitude of different cultures predicts the ability to adapt and understand different culture, a skill that has been called cultural intelligence (Crowne, 2013; Ng, Van Dyne, & Ang, 2012). Similarly, biculturals who have managed to integrate both of their cultural identities tend to be more proficient in dealing with different cultures (Thomas, Brannen, & Garcia, 2010).

Consistent exposure to social diversity thus seems to enhance the ability to understand diverse environments in the future. However, the skills necessary to make sense of complex diverse environments might be useful in other situations as well that are not related to intergroup interactions at all. The ability to think flexibly about dynamic and complex information should be useful in a wide array of situations. Experiences of

diversity might therefore lead to adaptation that impacts domains beyond diverse environments.

2.4 Adaptation to Diversity and its Potential Benefits

As discussed previously, gaining competence in processing diversity means learning to think in a non-rigid and divergent manner relatively detached from cognitive categories. In other words, frequently experiencing diversity should lead to more flexibility in thinking about social categories. According to the CPAG-model such cognitive flexibility should generalise to a wide array situations beyond the intergroup domain (Crisp & Turner, 2011). Cognitive flexibility is a key component of divergent creativity as it enables to break out of established cognitive structures and to think about people and concepts in new and creative ways (Guilford, 1967; Hennessey & Amabile, 2010). The CPAG model suggests that repeated processing of diversity will lead to improved cognitive flexibility in general, mainly by making the inhibition of dominant responses more automatic, freeing up resource for generative thought.

There is indeed ample evidence to suggest that individuals with a lot of exposure to diversity think in a more flexible and divergent manner: Research has shown that bicultural individuals are more cognitively flexible (Gutierrez & Sameroff, 2008; Tadmor, Galinsky, & Maddux, 2012), that multicultural experiences tend to boost creative thinking (Leung & Chiu, 2010; Leung et al., 2008; Maddux et al., 2010), and that diverse groups solve problems in a more innovative manner (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007; van Knippenberg et al., 2004). Furthermore, priming counter-stereotypical exemplars (e.g. female mechanic) can lead to improved cognitive flexibility in creative tasks (Gołowska, Crisp, & Labuschagne, 2012; Gołowska & Crisp, 2013).

However, the precise cognitive process that leads to an improvement in flexible and creative thought is much less clear. Inconsistency resolution usually requires both

suppression of stereotypical information as well as divergent, generative thought. Improvements resulting from experiences of diversity might affect both areas (inhibitory control or divergent creativity) or only one of them. Researchers have traditionally emphasised the beneficial effect of diversity on creativity (Gołowska & Crisp, 2014; Leung et al., 2008), but potential effects on inhibitory control are much less clear. If diversity does indeed lead to improved self-regulation this might facilitate divergent creativity as well as the suppression of dominant responses might be an integral part of coming up with innovative ideas (Benedek, Franz, Heene, & Neubauer, 2012). The CPAG model also assumes that improvements in self-regulation are an important aspect of adaptation to diversity: Repeatedly engaging with challenging diversity is assumed to make the inhibition of stereotypical information gradually more automatic, freeing up resource for generative thought (Crisp & Turner, 2011). There is thus reason to believe that diversity might lead to flexible cognition by providing the opportunity to improve one's self-regulatory ability.

2.5 Conclusion

In this chapter, I have discussed how the unprecedented rise of diversity in modern societies leads to new cognitive challenges for all members of society. Immigrants face challenges in constructing a coherent self-identity that integrates both the social identity of their original culture as well as that of their new host country. However, members of the cultural majority also must come to terms with a complex heterogenous social environment that is challenging to make sense of. I have argued that these challenges can be subsumed as conflicts of categorical information: People with complex social identities must resolve conflicts between the conflicting social categories that they are part of. However, merely observing social diversity brings the task to understand others with unexpected combinations of social identities, also requiring the resolution of

conflicts between the different social categories. The CPAG model (Crisp & Turner, 2011) has argued that resolving these stereotypical inconsistencies should require inhibition of categorical information as well as generative thinking. This implies that resolving stereotypical inconsistencies arising from diversity involve processes of inhibitory control as well as divergent creativity. While divergent creativity has been shown to benefit from experiences of diversity, it is less clear if diversity can lead to improvements in cognitive control as well. I will explore this issue further in the following chapter.

CHAPTER 3: ADAPTING TO ETHNICALLY DIVERSE ENVIRONMENTS THROUGH SELF-REGULATION

As reviewed in the previous chapter, repeated exposure to diversity might lead to improvements in the ability to suppress the impact of stereotypic content on judgements. If stereotype suppression recruits processes required for other acts of effortful cognitive control it should be expected that benefits for stereotype suppression can carry over to other areas of self-regulation, too. There are good reasons to assume that this is indeed the case: Suppressing stereotypical information has been shown to tap the same resource pool as other self-regulatory processes (Gordijn, Hindriks, Koomen, Dijksterhuis, & Van Knippenberg, 2004), and the ability to control racial stereotypes is predicted by neural correlates of cognitive control (Bartholow, Dickter, & Sestir, 2006). Diversity therefore has the potential to benefit self-regulation in general, which would affect a whole range of domains such as controlling aggression, making healthy life-choices, or academic success. In this chapter, I will review the literature that highlights the role of self-regulation, and describe how chronic exposure to cultural diversity might lead to general improvements in cognitive control.

In Chapter 2 I have reviewed evidence for the CPAG model which shows that frequent experiences of diversity can promote cognitive flexibility. This increase in cognitive flexibility is assumed to primarily stem from enhanced ability to suppress stereotypic content (Crisp & Turner, 2011). If diversity leads to improved stereotype inhibition, these benefits should also carry over to other areas of self-regulation. Such a general improvement in self-regulation should occur if the processes recruited in

stereotype suppression are identical to other situations (social and non-social) in which cognitive control is required.

In this chapter, I will review the research on diversity and stereotype suppression, and the role of cognitive control for inhibiting stereotypic content. Within this review, I will evaluate whether the processes of stereotype suppression are universal for other tasks of self-regulation, and whether frequent practice of stereotype suppression could lead to improvements in the ability to inhibit stereotypical and other types of content. Research looking at the role of conflict and inhibition for social diversity has primarily focused on the function of control within intergroup interactions and impression formations of outgroup members. In the following, I will offer an overview of the research conducted in these areas.

3.1 Controlling Bias in Intergroup Interactions

Social diversity inevitably leads to interactions between different social groups, so the ability to interact efficiently with outgroup members should be a crucial advantage in a socially diverse environment. The value of efficient intercultural communication is already apparent in business interactions. Across the world the workforce population is becoming increasingly diverse as a result of increased global mobility and immigration as well as organizations acting on a more global scale (Rosenzweig, 1998). Consequently, efficiency in intercultural communication and the ability to mediate between different cultural groups has become an asset for businesses. Cultural intelligence has been shown to have a positive effect on task and leadership performance in ethnically diverse business settings (Ang et al., 2007; Groves & Feyerherm, 2011; see Ng et al., 2012 for a review).

3.1.1 Intergroup Interaction as a Challenge for Self-Regulation

However, ensuring successful intergroup interactions can be challenging. For the exchange to go well, the involved persons must make sure to avoid any signs of explicit

or implicit prejudice. Preventing the expression of explicit prejudice is relatively straightforward, as it is the result of a deliberate process. In other words, individuals can simply choose to withhold expression of their attitudes (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Klöckner & de Raaf, 2013). Implicit prejudice, however, can automatically and unintentionally ‘leak’ through uncontrolled behavioural expressions (Dovidio, Kawakami, & Gaertner, 2002; Fazio, Jackson, Dunton, & Williams, 1995). A high level of implicit prejudice can express itself in nonverbal signs of discomfort in interactions with outgroup members, which in turn leads to leaving an unfriendly impression and low quality of the interaction (Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; McConnell & Leibold, 2001; Sekaquaptewa, Espinoza, Thompson, Vargas, & von Hippel, 2003). It is therefore not surprising that participants with high levels of implicit racial bias tend to have more short-lived relationships with interracial roommates (Towles-Schwen & Fazio, 2006). However, even participants with high levels of implicit bias can leave a positive impression in intergroup interactions if they are able to control and prevent their bias so that it does not express itself in overt behaviour (Gonsalkorale, von Hippel, Sherman, & Klauer, 2009).

For a successful interaction between members of different social groups, the involved individuals must thus carefully monitor and regulate their possibly biased responses. In other words, they have to engage in self-regulation (the ability to promote intended and goal-oriented behaviour; Amodio, 2014; Bartholow, 2010)¹, through the use of inhibitory control (implementing top-down control to constrain dominant

¹ The term used to refer to the array of processes underlying goal-directed behaviour differs across disciplines. These are also referred to as executive control (Chan, Shum, Touloupoulou, & Chen, 2008) or cognitive control (Koechlin, Ody, & Kouneiher, 2003) in the cognitive literature.

tendencies in favour of more appropriate responses; Logan, Schachar, & Tannock, 1997). The importance of self-control in intergroup interactions was already recognised by Allport (1954) when he remarked: “Especially when inner conflict is present, people put brakes upon their prejudices. They do not act them out—or they act them out only up to a certain point. Something stops the logical progression somewhere.” (pp. 332).

The ‘inner conflict’ that Allport spoke of has later been more precisely defined by researchers as a conflict between the automatic activation of stereotypes and controlled processes aiming to inhibit them (Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005; Devine & Monteith, 1999; Devine, 1989; Payne, 2005; Sherman et al., 2008). However, research has also shown that the pervasiveness of stereotypes can make their inhibition an especially challenging task. The activation of implicit stereotypes in intergroup encounters has been found to occur automatically and outside of awareness (Devine & Monteith, 1999; Devine, 1989; Fiske & Neuberg, 1990). This activation is generally assumed to then spread to personality characteristics ascribed to the social category in memory. These stereotypical expectancies then influence the judgement about the person as well as the behaviour displayed towards them (Fiske, Neuberg, Beattie, & Milberg, 1987; Stangor & Lange, 1994).

In some respects, this process can be adaptive for deriving meaning from social stimuli: Stereotypes reduce the complexity and amount of information required to form a basic understanding of another person (Dovidio & Gaertner, 2010; McGarty et al., 2004). They allow for rapid and efficient processing of social stimuli by filtering out and simplifying the information associated with the other individual. However, social categorization and stereotyping is also the basis for prejudice and intergroup bias (Dovidio & Gaertner, 2010). The prevalent influence of stereotypes on social judgements and behaviour can therefore be very problematic for intergroup harmony in a modern

society. The influence of automatic stereotypes on judgement and behaviour is indeed so pervasive that some researchers initially concluded that prejudice was an inevitable outcome of a highly persistent categorisation process (Bargh, 1999). The only chance to prevent prejudice from occurring would be to prevent the cultural transmission of negative stereotypes in the first place. Attempts to suppress stereotypes might even lead to so called rebound effects, the strengthened reappearance of stereotypic thought at a later time once cognitive resources are taxed or the motivation to suppress the stereotype has waned (Macrae, Bodenhausen, Milne, & Jetten, 1994).

However, subsequent research has demonstrated that in many instances the expression of automatically activated prejudice can be regulated and prevented (Devine & Monteith, 1999). A multitude of studies have now shown that even if implicit stereotypes have been activated individuals can prevent the expression of these stereotypes without rebound effects given sufficient internal motivation to do so (Gordijn et al., 2004; see Monteith, Lybarger, & Woodcock, 2009 for an overview). While internal motivation to control stereotypes has certainly proved vital for acting without prejudice, research has shown that motivated individuals can still fail in suppressing the influence of stereotypes if they lack the regulatory capacity to do so (Amodio, Kubota, Harmon-Jones, & Devine, 2006; Monteith & Voils, 1998; Muraven, 2008).

3.1.2 Behavioural Studies on Intergroup Interactions and Self-Regulation

The importance of executive control for preventing biased responses in intergroup interactions has been clearly demonstrated in the weapon identification task (WIT; Payne, 2005). In this task participants are primed with the face of a White or Black person and are subsequently shown an image of a handgun or tool. Participants then must classify the target image as a handgun or tool. Errors on this task are clearly driven by implicit stereotypes: Tools are more likely to be identified as handguns after a Black face prime

and handguns are more likely to be identified as tools after a White face prime. More importantly, however, this paradigm allows to differentiate between contributions of automatic and controlled processes using the process dissociation procedure (Jacoby, 1991). The control component obtained from the WIT has been found to be lower in states of ego depletion and to predict performance on general executive control tasks such as the anti-saccade task (Payne, 2005), the Stroop (Govorun & Payne, 2006) and the Flanker task (Amodio, Devine, & Harmon-Jones, 2008). This demonstrates that the control component in the WIT is measuring a more general component of cognitive control. That is, the control component in this task is not specific to the suppression of social stereotypes, but seems to stem from a broad executive process that is at work in other non-social tasks calling for the inhibition of dominant responses. This global component of cognitive control seems to determine if automatic biases express themselves in biased behaviour: Participants high on automatic bias in the weapon identification task are especially likely to evaluate a Black person negatively when they are also low in cognitive control (Payne, 2005).

Further research has shown that even when the motivation to prevent stereotyping is high, ego depletion can make it difficult to respond without prejudice (Muraven, 2008). Similarly, participants under cognitive load are more likely to be guided by stereotypes in an impression formation task (D. T. Gilbert & Hixon, 1991). Reversely, being busy with overriding stereotypical thoughts has been shown to lead to a weaker performance on tests of self-control, presumably caused by a depletion of regulatory resources (Gordijn et al., 2004). Cognitive exhaustion can also be observed after interethnic interactions. White participants showed weaker performance on the Stroop task after interacting with a Black individual (Richeson & Shelton, 2003; Richeson & Trawalter, 2005b; Richeson et al., 2003). This was especially true for participants with particularly high implicit bias

(Richeson & Shelton, 2003). The same pattern seems to hold for minority members involved in an interethnic exchange. Black participants were also impaired in their Stroop performance after interacting with a White person (Richeson, Trawalter, & Shelton, 2005). This was again qualified by their implicit intergroup bias. Cognitive depletion was only observed for Black participants who showed negative intergroup bias towards Whites (ingroup favouritism), not for participants who held favourable implicit attitudes towards Whites (outgroup favouritism). Based on these findings it has been suggested that the classic rebound effect (Macrae et al., 1994) can be explained in terms of cognitive depletion (Gordijn et al., 2004). Since the suppression of stereotypes requires cognitive control, engaging in the initial suppression task can lead to the depletion of regulatory resources. The subsequent rebound effect occurs, because cognitive resources have been depleted and the inhibition of stereotypes fails.

The vital role of self-control for preventing stereotyping is also highlighted by studies with the elderly. Older people tend to be more racially biased, and researchers had initially assumed that this reflected socialization at a time of more conservative racial attitudes (Danigelis & Cutler, 1991; Firebaugh & Davis, 1988; Wilson, 1996). While older cohorts were indeed socialized in more prejudiced times (G. M. Gilbert, 1951; Karlins, Coffman, & Walters, 1969), they are also known to have diminished cognitive control compared to younger participants (Connelly, Hasher, & Zacks, 1991; Hartman & Hasher, 1991; Zacks, Radvansky, & Hasher, 1996). This decline in cognitive control seems to be at least partially responsible for the tendency of older participants to express stereotypical attitudes. Older participants have been shown to be more likely to rate an African American athlete as less intelligent than a Caucasian athlete and to obtain higher scores on the modern racism scale (Von Hippel, Silver, & Lynch, 2000). These age differences in stereotyping and prejudice were mediated by age-related differences in

cognitive control. Subsequent studies confirmed that age differences in the expression of stereotypes are indeed due to diminished self-control (and hence failure to inhibit stereotypes) rather than increased stereotype activation. One of these studies (Stewart, von Hippel, & Radvansky, 2009) employed the process-dissociation procedure (Jacoby, 1991) on participants' scores on the implicit association task (IAT; Greenwald, McGhee, & Schwartz, 1998). This procedure allows for the separation of automatic and controlled components of the IAT score, similar to the procedure used in the weapon identification task described above (Payne, 2005). Older participants showed more implicit racial stereotyping on the IAT, but this age difference was driven exclusively by a decreased component of cognitive control rather than a stronger automatic stereotype component. Similar findings were obtained when participants' IAT scores were analysed by using the Quad model (Gonsalkorale, Sherman, & Klauer, 2009). The Quad model (Conrey et al., 2005; Sherman et al., 2008) can be seen as an extension of the process-dissociation procedure (Jacoby, 1991). Per the Quad model, responses on measures of implicit bias stem from four components: activation of association, detection, overcoming bias and guessing. In the study by Gonsalkorale et al. (2009) older participants again showed racial bias on the IAT, and this increased bias was fully explained by an age-related decrease of the overcoming bias component, a component that is considered to reflect controlled attempts to regulate automatic bias. These findings demonstrate that older participants exhibit similar levels of stereotype activation, but are more likely to fail in regulating and inhibiting them, leading to stronger expressions of stereotypes and prejudice.

3.1.3 Neuropsychological Studies on Intergroup Interactions and Self-Regulation

The idea that inhibitory control can modulate and prevent automatically initiated stereotypical responses is also corroborated by findings from neurological studies. Electroencephalography (EEG) measurement during the weapon identification task

revealed that the control component for black faces in this task was predicted by error related negativity (ERN; Amodio et al., 2008). The ERN component of the EEG is assumed to indicate the activity of a conflict monitoring system, located in the anterior cingulate cortex (ACC), and nearby medio-frontal regions (Botvinick, Braver, Barch, Carter, & Cohen, 2001). Participants with large ERNs are also more likely to take more time and respond with greater accuracy in all trials (Amodio et al., 2004). Other neural correlates of the self-regulatory system include the N2 and the negative slow wave (NSW) of the event related potential in EEG measures. The N2 is considered to also reflect the activity of the conflict monitoring system (Nieuwenhuis, Yeung, Van Den Wildenberg, & Ridderinkhof, 2003), and has also been linked to the conflict monitoring function of the anterior cingulate cortex (ACC; Van Veen & Carter, 2002). The amplitude of the NSW is assumed to indicate the implementation of cognitive control (Curtin & Fairchild, 2003; West & Alain, 1999). These components were both found to be modulated by the inhibition of race-biased responses (Bartholow et al., 2006). When participants had to withhold a response to Black-stereotypic words (e.g. lazy, violent, athletic) following a Black face prime, the amplitude of the N2 and NSW component was increased indicating a conflict between stereotypic content and intended response (N2), as well as increased efforts to resolve this conflict (NSW). Furthermore, successful inhibition of the response was associated by a larger NSW amplitude, supporting the idea that inhibiting stereotypic responses requires the implementation of cognitive control.

Research has also found that subliminal presentation of masked black faces can lead to increased activation of the amygdala (compared to white faces), a brain area associated with automatic emotional responses (Cunningham et al., 2004). Unmasked conscious presentation of the same stimuli, however, did not lead to an activation of the amygdala but rather to increased activity in areas of the dorsolateral prefrontal cortex

(DLPFC) and ACC. As mentioned above, the ACC is assumed to be part of a conflict detection system while the DLPFC has been associated with regulation and inhibition of unintended responses (Botvinick et al., 2001). In another study, the same regions were found to be more active during the presentation of black faces for White participants with strong automatic racial bias (Richeson & Shelton, 2003). Activity of the right DLPFC to black faces in the same study also predicted cognitive depletion after interaction with a Black experimenter.

3.1.4 Controlling Intergroup Bias Motivated by Norms

Based on the research to date there is thus strong evidence to suggest that people engage in cognitive control in interethnic interactions to inhibit stereotypical responses. This regulatory process likely stems from the motivation to prevent appearing prejudiced (Bodenhausen, Todd, & Richeson, 2009; Devine et al., 2002; Richeson & Shelton, 2007). Open expression of prejudice has become increasingly unacceptable as prevailing social norms have become more liberal (Devine, Plant, & Blair, 2001). Thus, expressing prejudice has become undesirable, because doing so would risk disapproval and sanctions from others (Plant & Devine, 1998).

The impact of these norms is demonstrated by studies manipulating the salience of social norms. When norms to be unprejudiced are made salient, participants tend to report lower levels of prejudice and stronger antiracist opinions (Blanchard, Crandall, Brigham, & Vaughn, 1994; Blanchard, Lilly, & Vaughn, 1991; Monteith, Deneen, & Tooman, 1996; Zitek & Hebl, 2007). Furthermore, external pressure is not the only motivation to appear unprejudiced. As the norm to be unprejudiced becomes more pervasive and widely held, individuals should internalize these values and strive to adhere to them simply to satisfy their own personal standards and maintain a positive sense of self (Higgins, 1987). In this case failure to prevent expression of prejudice might pose a

threat to the individual's self-image. In studies where false feedback suggested to participants that they are at risk of being prejudiced, they were more likely to behave altruistically in a subsequent interaction with a black person (Dutton & Lake, 1973). This behaviour might have served to restore the participant's self-image as a person who acts unprejudiced in accordance with prevailing social norms. Studies which manipulated the salience of norms opposing prejudice tend to find a reduction in prejudiced opinions regardless of whether these opinions were expressed publicly or privately (Blanchard et al., 1994, 1991; Monteith et al., 1996). These findings also suggest that internalization of norms condemning prejudice is common. Conforming with those norms, however, will require regulation and inhibition of automatic stereotypic responses.

3.1.5 Controlling Bias for Successful Intergroup Interactions

Suppression of prejudiced responses is required to comply with modern anti-prejudice norms, but in an ethnically diverse society stereotype inhibition is also instrumental for forming meaningful relationships. Being able to interact with different ethnic groups without expression of prejudice enables positive and high-quality encounters (Dovidio et al., 1997; McConnell & Leibold, 2001; Sekaquaptewa et al., 2003). When stereotypic responses are not properly regulated during intergroup interactions this can have harmful effects for the exchange. Non-Muslim participants with high implicit bias and low cognitive control are rated as less likeable in interaction with Muslims (Gonsalkorale, von Hippel, et al., 2009). Inhibition of stereotypes is therefore a requirement for making favourable impressions on members of other cultural and ethnic groups, something that should obviously be of high importance in a culturally diverse environment.

3.2 Controlling Intergroup Bias in Social Judgements

Apart from controlling one's own behaviour in intergroup interactions, the inhibition of stereotypes is likely to also be required when making sense of social actors in a diverse environment. As discussed in the previous chapter, social diversity leads to more encounters with stimuli that are stereotype-inconsistent (e.g. observing surprising category conjunctions such as a Romanian entrepreneur in the UK). Processing these type of stimuli should require inhibiting the unhelpful stereotypic associations to allow for more generative thinking about the inconsistency (Crisp & Turner, 2011). Fitting with this idea, categorising individuals with low prototypicality (e.g. stimuli with ambiguous facial features or well-liked outgroup members) generally has been found to take longer than for stimuli with high prototypicality (Livingston & Brewer, 2002; Richeson & Trawalter, 2005a). It has been suggested that this delay in categorisation might be caused by a response conflict that requires self-regulation to be resolved (Bartholow, 2010). This would be similar to response conflicts in classic cognitive control tasks such as the Eriksen Flanker task (Eriksen & Eriksen, 1974) or the Stroop task (MacLeod, 1991). Indeed, when target Black faces in a modified Flanker task are paired with stereotype-inconsistent words ('flankers') categorisation is slowed compared to a pairing with stereotype-consistent words (Bartholow & Dickter, 2008). This is in line with the idea that processing stereotype inconsistent information can be conceptualised as a response conflict. Further findings from the same study showed that when flankers showed a high rate of stereotype-consistent information, the EEG response during incompatible trials showed a positive deflection of the lateralized readiness potential, just before a response was made. This is usually considered as evidence of conflicting response tendencies, indicating an initial preparation of the incorrect response, before this response is overwritten with the execution of the correct one (Spencer & Coles, 1999). Furthermore,

on incompatible trials the N2 amplitude was increased, indicating activation of the conflict monitoring system. These results strongly indicate that observing stereotypical inconsistencies does require self-regulation to resolve the conflict. Since stereotypical inconsistencies are likely to be more frequent in ethnically diverse environments; it is not just preventing expression of prejudice that requires self-regulation in intergroup interaction, but also the task of making sense of one's social environments.

Hence, there is considerable evidence that inhibition of stereotypic responses could be a key skill for functioning in a diverse environment. Inhibition of automatically activated stereotypes can prevent the expression of prejudice. This ensures conforming to societal norms and one's own personal standards, but also enables positive and high-quality intergroup encounters. In addition, suppressing dominant stereotypic associations can aid the understanding of other social actors, especially if they seem inconsistent with prevalent stereotypes. Thus, stereotype suppression might be helpful not only in making a favourable impression on others, but also in understanding the motives of members of different social groups. These benefits of stereotype inhibition should be invaluable when attempting to build coalitions across group boundaries. The ability to cooperate across group boundaries should be a clear benefit if not a necessity for functioning in a diverse environment, since options for coalitions within ingroups will be the more limited the more socially heterogeneous a society is. This has led some researchers to speculate that it was the increasing complexity (i.e. diversity) of human societies that promoted the evolution of cognitive mechanism to suppress stereotypical representations, thus allowing for intergroup alliances (Crisp & Meleady, 2012; Crisp, 2015).

3.3 Benefits of Diversity for Self-Regulation

Functioning in an environment of ethnic diversity thus seems to require the skill to inhibit stereotypic responses: Inhibiting stereotypes through cognitive control is vital

for having fruitful interactions in a socially diverse setting (Devine & Monteith, 1999), and stereotype inhibition also plays a key role in comprehending actors in socially diverse environments by enabling the resolution of stereotypical inconsistencies (Crisp & Turner, 2011). Such inconsistency resolution is necessary to make sense of information that contradicts common stereotypes, something that is especially likely to occur in environments with cross-cutting and dynamic social identities, a characteristic of social diversity.

Inhibiting stereotypes through cognitive control is assumed to prevent irrelevant information from interfering with understanding counter-stereotypical individuals. This idea is supported by findings suggesting that stimuli containing conflicting stereotypical information activate a conflict monitoring system which is also recruited in other tasks requiring inhibitory control (Bartholow & Dickter, 2008). Collectively the findings reviewed so far strongly suggest that frequently engaging in cognitive control is a necessity to function in a socially diverse environment. That is, inhibitory control seems to be a necessary component to understand members of other social groups and to build meaningful relationships with them.

Consequently, individuals who are exposed to ethnic diversity on a regular basis should also be required to regularly engage in the inhibition of stereotypes. Therefore, it might be possible that individuals exposed to high levels of ethnic diversity improve in their ability to inhibit stereotypes through frequent opportunity for practice. Of course, for this practice to have any impact, one must assume that cognitive control is a capacity that can be trained.

3.3.1 Modulating Self-Regulation Through Training

Indeed, there is ample evidence to suggest that self-regulation can improve through practice. Repeatedly engaging in acts of effortful self-control (such as stereotype

inhibition) has been found to increase self-regulatory capacity for different kinds of tasks requiring control (Baumeister, Gailliot, DeWall, & Oaten, 2006). Training self-control over a few weeks (e.g. by using the non-dominant hand for certain tasks such as brushing teeth, refraining from colloquial speech or cutting back sweets, etc.) can increase cognitive control abilities in unrelated tasks, such as performing on the stop-signal task (Muraven, 2010b), a visual tracking task (Oaten & Cheng, 2006) or a concentration task (S. A. Hui et al., 2009). Other benefits after a self-control training intervention are improved ability to endure physical discomfort (S. A. Hui et al., 2009; Muraven, Baumeister, & Tice, 1999), inhibit aggressive behaviour (Denson, Capper, Oaten, Friese, & Schofield, 2011; Finkel, DeWall, Slotter, Oaten, & Foshee, 2009), and an increased likelihood to successfully quit smoking (Muraven, 2010b). Self-control training also increases the chance of following through with various other healthy life-choices such as following good eating or spending habits (Oaten & Cheng, 2006). Self-control training can also help to minimize depletion following attempts to suppress stereotypes (Gailliot, Plant, Butz, & Baumeister, 2007), demonstrating again that stereotype inhibition draws from the same resource pool as other cognitive control tasks.

3.3.2 Exposure to Diversity as Self-Control Training

These findings demonstrate that frequently engaging in acts of self-regulation can lead to long-term benefits for cognitive control in general. Frequent use of cognitive control is a necessity when living in an ethnically diverse environment. As discussed previously, ethnic diversity requires employing cognitive control on a regular basis due to the demands of intergroup interactions and sense-making of other individuals in a diverse environment. It might therefore be expected that individuals who are regularly exposed to ethnic diversity will ultimately improve in their self-regulatory ability. Such

cognitive adaptation would then ensure efficient processing of diversity related stimuli in the future.

The literature on self-control training suggests frequent engagement with ethnic diversity (and hence frequent acts of self-regulation), should lead to improvements in cognitive control by increasing self-regulatory capacity (Muraven et al., 1999; Muraven & Baumeister, 2000; Muraven, 2010a). Since other acts of self-control draw from the same resource pool this would benefit other acts of self-regulation outside the context of stereotype inhibition. In addition, some researchers have suggested that self-regulation might also improve through an alternative path, namely by automatization (Crisp & Turner, 2011; Devine & Monteith, 1999). That is, with repeated stereotype inhibition the process of suppressing stereotype associations might become automatic and hence occurs with much greater speed and ease. Such automatization might then generalise to other tasks that require the suppression of dominant responses (Crisp & Turner, 2011). Inhibitory control should therefore benefit from chronic exposure to ethnic diversity, either by improving self-regulatory capacity or by making the process of suppressing dominant responses gradually more automatic.

Stereotype inhibition does indeed seem to improve through practice, as demonstrated in laboratory studies. Participants who received training in negating stereotype associations were more likely to successfully inhibit distracting stereotype associations (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Kawakami, Dovidio, & van Kamp, 2005). Other supporting evidence comes from research on biculturals. Bicultural individuals are especially likely to frequently process social diversity, because they often have to negotiate potentially opposing cultural orientations within their own identity (Benet-Martínez & Haritatos, 2005). Thus, this group might engage in acts of inhibitory control particularly often (Hirsh & Kang, 2015; Hugenberg & Bodenhausen,

2004). Findings on the effect of multiple social identities on self-regulation are scarce, but tentatively support the idea that bicultural integration could lead to improvements in self-regulation. Successful linguistic acculturation of Mexican Americans, as measured by the use of English, has been found to be related to greater social self-control (Pokhrel, Herzog, Sun, Rohrbach, & Sussman, 2013). Also, multiracial participants seem to inhibit stereotypical associations more efficiently than monoracials (Shih, Bonam, Sanchez, & Peck, 2007).

Regarding other types of experiences of diversity, such as regular intergroup contact, to my knowledge no studies so far have explored the link between frequent intergroup contact and cognitive control. While frequent and positive intergroup contact has been shown to generally reduce the expression of intergroup bias (Graf, Paolini, & Rubin, 2014; Islam & Hewstone, 1993; Pettigrew, Tropp, Wagner, & Christ, 2011; Pettigrew & Tropp, 2006), this line of research has traditionally emphasized the role of affective components such as intergroup anxiety rather than testing for effects on self-regulation (Pettigrew, 1998; Stephan & Stephan, 1985; R. N. Turner, Hewstone, Voci, & Vonofakou, 2008). Intergroup anxiety certainly has been demonstrated to be crucial in predicting when participants will engage in prejudiced behaviour towards outgroup members. However, as discussed above, even when intergroup anxiety is absent, self-regulation is still required to prevent implicit stereotypes from interfering with the interaction (Gonsalkorale, Sherman, et al., 2009). Furthermore, self-regulation might also be necessary to inhibit stereotypical information when trying to make sense of counter-stereotypical observations in the interaction (Bartholow & Dickter, 2008; Bartholow, 2010).

3.4 Conclusion

To summarise, there is strong evidence to suggest that stereotype inhibition requires effortful cognitive control. Stereotype inhibition therefore engages self-regulatory processes active in other non-social tasks that require the suppression of dominant responses. Practice in inhibiting dominant responses can be considered a form of self-control training and has been shown to improve self-regulatory capacity. Since stereotype inhibition represents an act of self-control, frequent repeated stereotype suppression could lead to improvements for cognitive control. It seems reasonable to assume that an ethnically diverse environment will frequently call for stereotype inhibition, and that chronic exposure to ethnic diversity could therefore lead to improved self-regulation. This would mean that diversity could affect a whole range of different domains through improved cognitive control such as financial responsibility, controlling aggressive behaviour or making healthy life choices. However, research on the effects of diversity on self-regulation are somewhat scarce, especially concerning the effect of intergroup contact for majority members. In the following chapter, I will present a series of studies that explore the impact of ethnic diversity on self-regulation. In these studies, participants' exposure to ethnic diversity was measured (Study 1 and 2) as well as their contact with other ethnic groups (Study 3). The studies investigated the influence of these experiences of diversity on self-report measures of impulsiveness and delay gratification (Study 1 and 2), as well as on behavioural measures of cognitive control such as the Stroop task (Study 3).

CHAPTER 4: EXPOSURE TO DIVERSITY AND SELF-REGULATION

In the preceding chapter, I discussed research demonstrating that regular experiences of diversity have the potential to benefit self-regulation in social and non-social situations. This idea was put to the test in three studies reported in this chapter. I tested the hypothesis that experiencing greater levels of diversity would enhance self-regulatory ability. In general, studies showed that experiences of diversity only affected self-regulation when diversity was made salient. However, in contrast to predictions, the effect of diversity on self-regulation was detrimental rather than beneficial. Findings from Study 1 showed that experiences of diversity were marginally associated with reports of weak delayed gratification. This effect was replicated in Study 2, but experiences of diversity were also shown to only affect delayed gratification when diversity was salient. Self-regulation was measured with a behavioural measure, the Stroop Test, in Study 3. Findings demonstrated that experiences of diversity, such as positive contact, led to poorer performance on the Stroop when diversity was salient, corroborating results from the previous studies. Altogether, these results provide evidence that prolonged experiences of diversity are unlikely to result in enhanced cognitive control, and in contrast, may actually lead to reduced cognitive control when brought to mind. Implications and potential mechanisms that can explain these findings are discussed.

As laid out in the previous chapter, prior work on intergroup contact highlights the role of self-control for functioning in a culturally diverse society: Self-regulatory control is a crucial skill to manage intercultural interactions (Amodio et al., 2008; Schlauch, Lang, Plant, Christensen, & Donohue, 2009) and for making social judgements in a diverse environment (Bartholow & Dickter, 2008; Bartholow, 2010; Conrey et al.,

2005; Payne, 2005). Adjusting to a socially diverse environment requires the ability to interact with members of different cultural groups without prejudice, because it enables positive and high-quality interactions (Plant, 2004). Individuals who are effective in responding without prejudice have been shown to be able to exert more cognitive control and engage in more conflict monitoring, even when under cognitive load (Amodio et al., 2008; Schlauch et al., 2009). Importantly, the ability to control racial stereotypes in such situations has been shown to tap the same resource pool as other self-regulatory processes (Gordijn et al., 2004; Richeson & Trawalter, 2005b). Furthermore, the ability to control racial stereotypes is also predicted by neural correlates of cognitive control (Bartholow et al., 2006; Bartholow, 2010).

Beyond intercultural interactions, just processing perceptions of diverse environments seems to engage self-regulatory processes as well. Diverse environments are more likely to present stereotype-inconsistent stimuli, and processing these types of stimuli have been shown to involve self-regulatory processes within the conflict monitoring system (Bartholow & Dickter, 2008; Bartholow, 2010).

It therefore seems reasonable to expect that living in a socially diverse environment can lead to adaptation via enhanced inhibition and self-regulation (Crisp & Meleady, 2012; Crisp & Turner, 2011). Increased self-regulatory control would affect a whole range of domains such as controlling aggression (Gailliot, Baumeister, et al., 2007), making healthy life-choices (Boals, Vandellen, & Banks, 2011; Moffitt et al., 2011), and academic success (Bembenutty & Karabenick, 1998; Tangney, Baumeister, & Boone, 2004). However, while in theory a lot of exposure to diversity might affect self-regulation, to my knowledge no available studies have explored this link thus far.

Furthermore, research on the impact of diversity on cognition has predominantly focused on the consequences for biculturals (Benet-Martínez, Lee & Leu, J., 2006;

Gocłowska & Crisp, 2014; Tadmor, Galinsky, et al., 2012; Tadmor, Hong, et al., 2012; Tadmor et al., 2009). This work has played a major role in understanding the broader effects of diversity on cognition and behaviour, but work on the psychological consequences of ethnic diversity for majority members has been lacking. Theoretical work on the CPAG model has stressed that majority and minority members do in principle face the same type of challenges in a diverse environment, namely resolving inconsistencies of social categories (Crisp & Turner, 2011). This happens either by perceiving stereotypical inconsistencies (for majority members) or by belonging themselves to social categories that are stereotypically inconsistent (for minority members). Cognitive responses to diverse environments should therefore follow a similar trajectory for majority and minority members. Culturally diverse environments consist of bicultural individuals as well as of members of the cultural and ethnic majority, and the consequences of an increased diversity in society can only be fully understood if the impact of this change on all groups is studied.

However, studies that have explored the cognitive impact of perceiving diversity on cognition were so far either limited to short term effects to one-off exposure to diverse stimuli in the lab or might not generalise to living in diverse environments as majority members: Immediate exposure to counter-stereotypes have been shown to elicit a boost in flexible, creative cognition (Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Vasiljevic & Crisp, 2013). Also, multicultural stimuli containing signifiers of different cultures have been shown to have similar effects (Cheng & Leung, 2013; Cheng, Leung, & Wu, 2011; Leung et al., 2008). As discussed in the last chapters, these studies provide valuable insights as to what cognitive processes are momentarily enhanced when processing diverse stimuli. However, it does not necessarily follow from these studies that such effects can lead to long-term cognitive change.

Other studies have shown that multicultural experiences and time spent abroad predicts performance on creativity tasks (Maddux et al., 2010; Maddux & Galinsky, 2009, 2009; Tadmor, Satterstrom, Jang, & Polzer, 2012). Even though these studies are important to show that diversity can have long-lasting cognitive benefits, they might not directly apply to the situation of majority members living in diverse environments. Spending time abroad is comparable to the situation of cultural minorities, since sojourners must interact with a majority culture that they are not a member of. Indeed, the only difference to classic studies of acculturation of minority members might be that sojourners know that their exposure to a different culture will be of limited duration. Studies that used multicultural experience as a variable have usually measured it through the multicultural experience scale (MES; Leung & Chiu, 2010). This scale taps into a broad range of multicultural experiences such as spending time abroad, bilingualism, birth place of parents, and exposure to other cultures through cuisine, music or friends from foreign countries. While this scale is certainly well suited to measure general exposure to diversity, it does not exclusively measure experiences of diversity as a majority member. Therefore, more work is needed to investigate if experiencing diversity as a majority member is sufficient to elicit cognitive change.

Pioneering work has shown that majority members that live in ethnically diverse neighbourhoods conceptualize their own social identity in more complex ways (Schmid et al., 2013). But if living in an ethnically diverse neighbourhood also influences cognitive factors beyond social categorization has so far not been studied.

In the following I will present a series of studies exploring the impact of diversity on self-regulation. These studies were conducted with White British participants (the

ethnic majority) who grew up in England². It was predicted that individuals who have experienced more diversity should have acquired better self-regulation skills to more effectively adapt to a diverse environment. This possibility was first explored in a correlational study (Study 1). Findings from this study were then qualified in experimental paradigms, measuring self-regulation via self-reports (Study 2) as well as through behavioural measures (Study 3).

Based on the results of a pilot study (reported below), diversity was operationalised as mere exposure to ethnic diversity. Ethnic diversity was measured using objective as well as subjective methods. Objective methods employed census data on district diversity, while subjective methods involved participant's estimated ethnic diversity of their environment. Objective data on district diversity served as a proxy for mere exposure to different cultural groups. Subjective diversity, on the other hand, might also be influenced by the salience of diversity for the individual. By including both types of measures these studies allow to draw a more complete picture of the impact of diversity.

4.1 Pilot Study

A pilot study was conducted to determine the most appropriate measures for diversity, and which aspect of diversity might be most relevant for self-regulation. Diversity was operationalised as mere exposure to diversity and recent subjective experiences of diversity. Exposure to diversity was measured through census data on ethnic diversity and by questions on the subjective ethnic diversity of participant's environment. Recent subjective experiences of diversity were assessed through various

² The area of origin for the presented studies was restricted to England rather than the United Kingdom, because the studies made use of data on ethnic groups from the 2011 Census of the UK. Questions on ethnicity differ slightly between countries in this survey. For consistency, I therefore chose to only obtain data for England.

questions. Self-regulation was operationalised as reporting low levels of general impulsiveness. To also obtain a measure of self-regulation that is of practical relevance to the participants' everyday life, an additional measure for compulsive buying behaviour was also included in this study.

4.1.1 Method

Participants. For this pilot study, 50 White British participants were recruited at the University of Sheffield. Students of the psychology department were invited via email to participate in an online study on "Intercultural experiences of students in the UK". In exchange for participation, students were rewarded with course credits. To participate, the student's hometown had to be located within England, and the students had to access the survey from a non-mobile device. Ethnic membership was not indicated as a criterion as this might have made group membership overly salient which could have influenced results. Instead members of ethnic minorities (non-White British participants) were filtered out after data collection. The participants (47 females, 3 males) were aged between 18 and 50 years ($M = 19.60$, $SD = 4.84$).

Procedure and materials. After signing an informed consent, participants first answered demographic questions, followed by questions on their subjective exposure to ethnic diversity. Subsequently, participants answered questions on their recent experiences of diversity. Participants then completed the BIS-Brief (BIS-Brief; Steinberg et al., 2013) and the Compulsive Buying Scale (Faber & O'Guinn, 1992). After completion of the study, participants were thanked for participation and debriefed.

Demographic measures. Participants indicated their age, gender and ethnicity. Furthermore, participants were asked about their ethnicity and home district (defined as the area in which they spent the most time until they turned 18).

Prior exposure to diversity. To assess how much participants were confronted with ethnic diversity while growing up, objective data as well as subjective self-reports of the ethnic diversity of the participants' environment were combined into a measure of prior exposure to diversity.

Objective ethnic diversity of home district. To measure the ethnic diversity of participants' home districts I derived an ethnic diversity index for these districts from the 2011 UK Census (Office for National Statistics, 2013). For this index the Hirschman-Herfindahl index was subtracted from unity, a measure commonly used in sociology to indicate the ethnic diversity of a geographic unit (Hirschman, 1964; Schaeffer, 2013).³ This index can be written as:

$$Diversity\ Index = 1 - \sum_{i=1}^k s_i^2$$

where s_i denotes the proportion of individuals belonging to ethnic category i , and k represents the number of ethnic groups. This index specifies the chance that two random persons of a district belong to a different ethnic group. It can range from 0 (only one ethnic group is present) to 1 (population is divided into an infinite number of ethnic groups).

In the context of this study the main ethnic groups as measured by the 2011 UK Census were White British, White Other, Asian or Asian British and Black or Black British (Office for National Statistics, 2013). Additionally, an 'other or mixed' category was also included. The diversity index for this study can therefore be written as:

³ This index is occasionally also accredited to Taylor and Jodice (1983) or Blau (1977).

$$\text{Diversity Index} = 1 - ((p(\text{White British})^2 + p(\text{White Other})^2 + p(\text{Asian/Asian British})^2 + p(\text{Black/Black British})^2 + p(\text{Other or Mixed})^2)$$

The diversity for England as a whole is .35, with single districts in this pilot study scoring from .05 (Allerdale) to .76 (Lewisham) ($M = .29$, $SD = .21$). The diversity index per region for England is displayed in Table 1; region is a geographical unit two tiers higher than district, which is the geographical unit used in this study. This table also lists the number of participants per region.

Table 1

Objective Diversity Index for Regions of England.

Region	Diversity Index	<i>n</i> for Pilot Study
East of England	.27	7
East Midlands	.26	5
London	.72	3
North East	.12	4
North West	.24	7
South East	.27	4
South West	.16	3
West Midlands	.36	4
Yorkshire and the Humber	.26	13

Prior subjective exposure to ethnic diversity. After responding to demographic questions, participants estimated the proportion of students in their secondary school belonging to each of the four major ethnic groups in the UK (White British, White other, Asian/Asian British, Black/Black British, Mixed or Other). If the participant went to several schools he or she was asked to consider the school, they went to before university. They also estimated the proportions for people living in the neighbourhood they grew up in. If a participant lived in several neighbourhoods while growing up he or she was asked

to make the estimate for the neighbourhood where the participant had lived for the longest time period. The full scale is reported in Appendix A.

For both questions, the Hirschman-Herfindahl index was again computed and subtracted from unity to derive an index for participants' subjective exposure to diversity. The resulting index indicated the chance in percentages that two random members of the school/neighbourhood belonged to different ethnic groups, assuming participant's subjective distribution of ethnic group members.

The correlation for the two separate subjective indices was $r(48) = .54, p < .001$. Both indices were averaged into a single measure for subjective exposure to diversity. The range of this index was .31 to .71 ($M = .31, SD = .16$).

Combined index for prior exposure to diversity. The subjective and objective diversity indices showed a strong correlation, $r(48) = .62, p < .001$. The measures were combined into a single index for diversity exposure by transforming the scores on both the subjective and objective index to their corresponding z-score and then computing the mean of these scores. This standardised composite diversity index ranged from -1.31 to 2.35 ($M = .00, SD = .90$).

Recent experiences of diversity. Recent diversity experiences made during the past year were measured through a scale containing 21 items. The items were drafted by tapping into different domains of inter-ethnic diversity such as acquiring knowledge about different cultures (for example: "I acquired knowledge about a culture that is not my own.") interpersonal contact (for example: "I have met many people from different cultural backgrounds."), interethnic exchange in one's immediate environment (for example: "Where I lived lots of different cultures came together and interacted with each other."), and the experienced challenge elicited by diversity (for example: "I experienced situations that were completely new for me."). Items were rated on a Likert-Scale from 1

(*strongly disagree*) to 5 (*strongly agree*). The full scale is reported in Appendix B. The initial scale showed acceptable internal reliability, Cronbach's $\alpha = .64$ (but see results section for an exploratory factor analysis of this scale).

Barratt Impulsiveness Scale-Brief. After participants answered questions about their exposure to diversity, they completed the Barratt Impulsiveness Scale-Brief (BIS-Brief; Steinberg et al., 2013; reported in Appendix D). The BIS-Brief is a recently developed short version of the 11th revision of the Barratt Impulsiveness Scale (Barratt, 1959; Reise, Moore, Sabb, Brown, & London, 2013; Reise et al., 2013; Stanford et al., 2009). The BIS-Brief aims to measure general impulsivity as a unidimensional construct. The scale includes eight items such as "I do things without thinking" and is scored on a Likert-scale from 1 (*rarely/never*) to 4 (*almost always/always*). For this sample, the measure showed good internal consistency (Cronbach's $\alpha = .78$).

Compulsive Buying Scale. The compulsive buying scale was developed to identify compulsive buyers (Faber & O'Guinn, 1992), and taps into the behaviours, motivations and feelings associated with buying. Compulsive buying is a case of failed impulse control and has been linked to low self-regulation (Claes et al., 2010). The scale contains seven items such as "If I have any money left before I receive my next income, I just have to spend it" and is scored on a Likert-scale from 1 (*Never*) to 5 (*Very Often*). The full scale can be found in Appendix E.

4.1.2 Results

All statistical tests described below were carried out with a level of significance of $\alpha = .05$.

Data inspection. Data inspection revealed that the index for prior exposure to diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis

was therefore carried out with the square root transformed data for exposure to diversity. Means and standard deviations are reported for untransformed data for ease of interpretation.

Factor analysis of the recent experiences of diversity scale. An exploratory factor analysis was conducted on the items of the recent experiences of diversity scale. This analysis served to investigate the number and structure of constructs contained in this measure. Although the sample size was small and unlikely to have enough power for an adequate factor analysis, the analysis was done to explore potentials measures of experiences of diversity for future studies.

The factorability of the 21 items was examined according to several criteria. 19 of the 21 items had a correlation of $r > .3$ with at least one other item (see Appendix C for correlations between all items), suggesting acceptable factorability. However, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was .59, and therefore below the recommended threshold of .6. This led to the exclusion of Item 5 and 6, which both correlated only weakly with the other items. After the exclusion of these items, all remaining 19 items had correlations of $r > .3$ with at least one other item. Furthermore, the KMO was .64 and the Bartlett's test of sphericity indicated that the R-matrix was not an identity matrix, $\chi^2(171) = 397.90, p < .001$. Conducting a factor analysis on the data was therefore deemed appropriate.

Principle component analysis was used as the method of data reduction, because the primary purpose was to obtain composite scores for the factors underlying subjective reports of diversity experiences. The initial eigen values showed that the first factor explained 28% of the variance, the second factor 12% of the variance, and a third factor 11% of the variance. Furthermore, the fourth factor explained 8% of the variance, and the fifth factor 6%. While the scree-plot suggested a two factor solution, the Kaiser's

Eigenvalue criterion suggested a five factor solution. Five, four, three and two factor solutions were considered, using oblimin rotations of the factor loading matrix. While double-loading of items was an issue for all solutions, the two factor solution was preferred, because it minimised the issue of double-loadings and provided components that were less complex than the ones obtained from the other solutions.

During several steps, a total of five items (Items 1, 2, 3 and 8) were eliminated because they did not contribute to a simple factor structure and failed to meet the criteria of having a primary factor loading of .4 or above, and no cross-loading of .3 or above.

A principle-components factor analysis of the remaining 14 items, using oblimin rotation was conducted, with the two factors explaining 45% of the variance. All items had primary loadings over .42 with no cross-loading above .3. The factor loading matrix for this final solution is presented in Table 2. The first component of the final solution explained 30% of the variance and was labelled personal experiences of diversity as it seemed to centre around personal experiences of cultural diversity. The lead item for this component was 'I had much exposure to different cultures'. The second component explained 15 % of the total variance and was labelled experienced homogeneity of environment, because this component appeared to indicate the perceived cultural homogeneity (versus diversity) of the participants' immediate social environment. The lead item of this component was 'Where I lived most people coming from a different culture mostly stayed to themselves'.

Internal consistency for the personal experiences of diversity scale was *Cronbach's* $\alpha = .82$, and *Cronbach's* $\alpha = .72$ for the homogeneity of environment scale. Composite scores were computed for both factors based on the mean of the items which had their primary loadings on each factor. The homogeneity of environment component was reversed to reflect the diversity of a participants' environment.

Table 2

Factor Loadings and Communalities for the Final Two Factor Solution Based on a Principle Components Analysis With Oblimin Rotation for the Recent Experiences of Diversity Scale From the Pilot Study (Sorted by Factor Loadings).

Item	Personal experiences of diversity	Experienced homogeneity of environment	Communality
7 - I had much exposure to different cultures	.87		.78
9 - I met many people from different cultural backgrounds	.77		.18
14 - I regularly socialized with people from different cultures	.71		.59
13 - Most of my social activities involved my usual group of friends	-.64		.24
11 - I met people with attitudes and values very different from mine	.63		.39
12 - I had the opportunity to meet people outside my usual group of friends	.60	-.29	.50
20 - I had to change some of my habits in order to adapt to the people around me	.55		.40
10 - Most people I met were from the same culture as I am	-.50		.54
4 - Many of my friends live or have lived abroad	.42		.55
16 - Where I lived most people coming from a different culture mostly stayed to themselves	.26	.73	.54
15 - Where I lived lots of different cultures came together and interacted with each other		-.71	.55
16 - Where I lived most people from other cultures were well integrated		-.70	.56
18 - Where I lived most people did not have a lot of contact with people from other cultures	-.21	.69	.21
19 - The people in my neighbourhood mostly had the same cultural background as me		.47	.31

Note. Factor loadings < .2 are suppressed

Correlations. The intercorrelations between the different measures, means and standard deviations are displayed in Table 3. Partial correlations controlling for age is displayed in Table 4⁴. After controlling for age, high exposure to ethnic diversity in one's hometown was related to higher general impulsivity as measured by the BIS, $r(47) = .29$, $p = .04$. No other reliable correlations between variables emerged from the analysis, $r_s < .20$, $p_s > .17$.

Power analysis. It should be noted that the purpose of this pilot study was not to establish statistical significance for associations between variables, but rather to explore potential types of diversity experience which might impact self-regulatory performance. Such potential associations still have to be confirmed in further studies with more appropriate sample sizes. Nonetheless, I evaluated the ability of this pilot study to detect associations between diversity and measures of impulsiveness. Previous studies suggest that diversity has large to medium effects on some factors outside the intergroup domain such as creativity (Maddux et al., 2010; Maddux & Galinsky, 2009; Tadmor et al. 2012; Leung & Chiu, 2010). I therefore first calculated the power for an assumed effect size of $r = .35$. The post-hoc power for this study was $power = .69$. Furthermore, this study had an appropriate sample size to detect a minimum effect size of $r = .38$ at $power = .80$. However, it should be noted the effect size of a potential association between diversity and cognitive inhibition might very well differ substantially compared to creativity, since this was the first study investigating the link between diversity and inhibition.

⁴ The data was not controlled for gender as only three participants were male. Gender is also not included in table 1 for the same reason.

⁵ I based the calculation of power on estimated population effect sizes rather than the observed effect size in this study. Power analysis based on the observed effect size (sometimes called post-hoc power analysis) only restates the obtained p-values in a different way (i.e. p-values can be directly converted to power; also see Goodman & Berlin, 1994; O'Keefe, 2007). I therefore opted to conduct a power-analysis based on estimated population effect sizes to make more informative claims about the sensitivity of this study.

Table 3

Intercorrelations, Means and Standard Deviations for the Pilot Study

Variable	1	2	3	4	5	6	<i>M</i>	<i>SD</i>
1. Exposure to diversity	-						- .8	.88
2. Personal experiences of diversity	.20	-					2.97	.60
3. Experienced homogeneity of environment	.17	.24 [†]	-				2.82	.75
4. BIS-Brief	.25 [†]	.15	-.05	-			2.14	.47
5. Financial Impulsivity	.19	.10	-.05	.14	-		1.7	.40
6. Age	-.21	-.26 [†]	-.21	-.13	.15	-	19.6	4.84

Note: BIS-Brief = Barratt Impulsiveness Scale-Brief

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 4

Partial Correlations for the Variables in the Pilot Study Controlling for Age

Variable	1	2	3	4	5
1. Exposure to diversity	-				
2. Personal experiences of diversity	.13	-			
3. Experienced homogeneity of environment	.16	.20	-		
4. BIS-Brief	.29*	.15	.08	-	
5. Financial Impulsivity	.17	.12	-.07	.16	-

Note: BIS-Brief = Barratt Impulsiveness Scale-Brief

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

4.1.3 Discussion

In this pilot study, participants who had been exposed to more diversity in their home district were more likely to report higher impulsiveness. Given that this effect was opposite to prior predictions, it warrants further inspection. Therefore, Study 1 set out to validate this effect.

While this study was successful in establishing a preliminary scale for personal experiences of diversity and perceived diversity of one's environment for the past year, these scales were not related to either exposure to diversity in one's hometown or to measure of self-regulation. One reason might be that these types of experiences of diversity are quite different. Personal experiences of diversity might tap into experiences of diversity that are more intense and potentially influenced by personal choice. Exposure to diversity that occurred simply because the hometown of the participant is more ethnically diverse might be perceived as relatively mundane and natural. These casual experiences of ethnic diversity in everyday life might be important for the participant to respond to the diversity by cognitive change and not by sub-typing challenging aspects of diversity as exception to the stereotypical rule (Weber & Crocker, 1983; Hewstone, 1994). Furthermore, a participant has usually no control over the area in which he or she grows up and has limited options to escape the realities of this social environment. Thus, growing up in a socially diverse environment might be more likely to drive cognitive change than experiences of diversity that happen through voluntary choice.

The perceived diversity of one's current environment is of course conceptually similar to exposure to diversity due to ethnic diversity of the participant's home district. However, the low correlation between these two measures might simply occur because the participants relocated when beginning their studies. This explanation seems likely as only three of the 50 participants in this pilot study grew up in the Sheffield district, which is where participants in this study went to university. Regarding the impact on impulsiveness, the time period in which participants grew up might be more influential for the development of the participants' self-regulatory abilities, and therefore show an impact on self-regulation measures, while the diversity of the current social environment does not.

Hence, exposure to diversity due to ethnic diversity of the participant's home district seemed to influence the participant's impulsiveness. However, this effect was opposite to prior predictions. As such an effect would have important theoretical implications it was further investigated in the following studies.

4.2 Study 1: Diversity, Impulsiveness and Delayed Gratification

Following up on the pilot study, the first study aimed to investigate if growing up in an ethnically diverse environment has an impact on self-regulation. Self-regulation was operationalised as reporting less impulsive behaviour and resisting immediate rewards. Self-reported impulsive behaviour was measured by the Barratt Impulsiveness Scale-Brief (BIS-Brief; Steinberg, Sharp, Stanford, & Tharp, 2013). This measure is intended to measure general impulsiveness as an uni-dimensional concept. This measure was chosen to investigate impulsiveness as expression of failed inhibitory control (Enticott, Ogloff, & Bradshaw, 2006; Logan et al., 1997). An additional variable was the self-reported ability to delay gratification in an academic context, as measured by the Academic Delay of Gratification Scale (ADOG; Bembenuy & Karabenick, 1998). This measure was served as a measure of self-regulation that is of immediate relevance to the (student) participants.

4.2.1 Method

Participants. For this study, 128 White British participants were recruited at the University of Sheffield. Students of all faculties were invited via email to participate in an online study on how "university students make decisions related to their studies". In exchange for participation, students entered a prize draw for vouchers for several British shops. To participate, the student's hometown had to be located within the UK, and the students had to access the survey from a non-mobile device. Ethnic membership was not indicated as a criterion as this might have made group membership overly salient which

could have influenced results. Instead members of ethnic minorities (non-White British participants) were filtered out after data collection. The participants (90 females, 38 males) were aged between 18 and 49 years ($M = 21.59$, $SD = 4.44$). Some participants had missing data (i.e. did not answer all questions); 119 participants provided data for all variables. To maximise power, I applied a pairwise deletion of missing cases for the correlations reported below (degrees of freedom are reported for each individual correlation).

Procedure and materials. After signing an informed consent, participants first answered demographic questions, followed by questions on their subjective exposure to ethnic diversity. Subsequently, participants completed the brief version of the Barratt Impulsiveness Scale (BIS-Brief; Steinberg et al., 2013), and the Academic Delay of Gratification Scale (ADOG; Bembenutty & Karabenick, 1998). After completion of the study, participants were thanked for participation and debriefed.

Demographic measures. Participants indicated their age, gender, and subjective socioeconomic status (SES) by ranking themselves on a 10-rung ladder representing socioeconomic status in society (Singh-Manoux, Adler, & Marmot, 2003; reported in Appendix F). Scores on this measure for this study ranged from 2 to 9 ($M = 5.84$, $SD = 1.46$). Apart from subjective SES, communal SES was also measured by using the Index of Multiple Deprivation (IMD, see below). Furthermore, participants were asked about their ethnicity and home district (defined as the area in which they spent the most time until they turned 18).

Index of Multiple Deprivation. The IMD is an index employed by the British government to assess the level of social and economic deprivation of small regional areas (Lad, 2011), and summarises a range of various indicators (e.g. income, health deprivation and crime). For this study the average score per district was used (Department

for Communities and Local Government, 2013). In this sample, the IMD for participant's home district ranged from 4.47 to 37.62 ($M = 20.10$, $SD = 8.49$).

Diversity. To assess how much participants were confronted with ethnic diversity while growing up, objective data as well as subjective self-reports were combined into a measure of prior exposure to diversity. This measure was identical to the measure of prior exposure to diversity reported in the pilot study.

Self-regulation. Self-regulation was operationalized as the tendency for impulsive behaviour and the ability to delay gratification. Measures used were the BIS-Brief (identical to the pilot study) and the Academic Delay of Gratification Scale.

Academic Delay of Gratification Scale. In addition to the BIS-Brief, participants completed the Academic Delay of Gratification Scale (ADOG; Bembenutty & Karabenick, 1998), a scale measuring university students' ability to delay immediate rewards in favour of long-term academic success. Items on this scale describe a hypothetical scenario in which the participant can choose one of two options. One option offers an immediate reward while the other represents delayed gratification (for example: "A. Miss several classes to accept an invitation for a very interesting trip OR B. Delay going on the trip until your courses are over"). Participants indicated which of the two options they would most likely choose on a 4-point scale: 1 - *definitely choose A*, 2 - *probably choose A*, 3 - *probably choose B*, and 4 - *definitely choose B*. The full scale is reported in Appendix G. The measure showed acceptable internal consistency for this sample (Cronbach's $\alpha = .66$).

4.2.2 Results

All statistical tests described below were carried out with a level of significance of $\alpha = .05$.

Data inspection. Data inspection revealed that diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for diversity. Means and standard deviations are reported for untransformed data for ease of interpretation.

Correlations. The intercorrelations between the different measures, means and standard deviations are displayed in Table 5. Partial correlations controlling for age, gender, communal SES and subjective SES are displayed in Table 6.

After taking control variables into account, low scores on the ADOG scale were related to stronger general impulsivity as measured by the BIS, $r(113) = -.47, p < .001$, thus suggesting that both measures tapped into similar constructs. In opposition to predictions, diversity was marginally negatively correlated with the ability to delay gratification, $r(113) = -.17, p = .08$.

Power analysis. I evaluated the ability of this study to detect associations between diversity and impulsivity or the ability to delay gratification by calculating the level of statistical power. Based on the observed effect size in the pilot study, I calculated the power for an assumed effect size of $r = .29$. The power of this study for such a population effect size was $power = .90$. Furthermore, this study had an appropriate sample size to detect a minimum effect size of $r = .25$ at $power = .80$.

Table 5

Intercorrelations, Means and Standard Deviations for Study 1

Variable	1	2	3	4	5	6	M	SD
1. Diversity	-						.02	.17
2. BIS-Brief	.06 (118)	-					2.05	.45
3. ADOG	-.17 [†] (118)	-.49 ^{***} (123)	-				3.01	.44
4. Age	-.14 (119)	-.13 (124)	.17 [†] (123)	-			21.59	4.44
5. Gender ^a	-.04 (119)	.08 (124)	-.21 [*] (123)	-.05 (126)	-		.30	.46
6. Communal SES (IMD)	.25 ^{**} (11+)	.04 (118)	-.01 (117)	.07 (119)	-.02 (114)	-	20.10	8.49
7. Subjective SES	.08 (119)	-.07 (124)	-.03 (123)	-.28 ^{**} (126)	.16 [†] (126)	-.13 (119)	5.84	1.46

Note: BIS-Brief = Barratt Impulsiveness Scale-Brief; ADOG = Academic Delay of Gratification Scale; SES = socioeconomic status; IMD = Index of Multiple Deprivation
Degrees of freedom for significance tests are given in parenthesis.

^aGender was coded 0 for female and 1 for male.

[†] $p < .10$. ^{*} $p < .05$. ^{**} $p < .01$. ^{***} $p < .001$

Table 6

Partial Correlations for Study 1 Controlling for Age, Gender, Communal SES and Subjective SES

Variable	1	2
1. Diversity	-	
2. BIS-Brief	.04 (113)	-
3. ADOG	-.17 [†] (113)	-.47 ^{***} (113)

Note: Degrees of freedom for significance tests are given in parenthesis.

BIS-Brief = Barratt Impulsiveness Scale-Brief; ADOG = Academic Delay of Gratification Scale

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

4.2.3 Discussion

In this first study, participants who had been exposed to more diversity in their home environment were marginally more likely to be poor at delaying gratification in an academic context. While this effect was only approaching significance, it might still be worth further consideration, especially since the direction of the effect was opposite to prior predictions. At the same time, this pattern was not accompanied by a tendency towards increased impulsiveness.

Hence, exposure to diversity while growing up might be related to a preference for immediate rewards. This might indicate that experiences of diversity do have a generally detrimental effect on self-regulation. It is worth noting, however, that the delay gratification scale was completed after participants had answered questions on their home district's diversity. It is possible that reduced self-regulation among individuals from high

diversity environments is a learned response to thinking about diversity itself. For individuals with diversity experience, thinking about diversity might activate a mindset (Wyer & Xu, 2010) focussed on processing diversity, which might also affect self-reported delay gratification. In this case experiences of diversity would only be detrimental for self-reported self-regulation in certain contexts. Study 2 therefore investigated if the effects of diversity experiences on self-regulation might depend on the salience of diversity itself, and not be present under neutral conditions.

4.3 Study 2: The Salience of Diversity as a Moderator

In Study 1 participants coming from environments with high diversity were marginally more likely to show a weak ability to delay gratification. Since this effect was only approaching significance it warrants further investigation. It is also unclear, however, if such an effect was induced by having participants think about their experiences of diversity first. Participants from diverse areas might show poor self-regulation only when diversity is salient. Salient diversity might influence self-regulation because it activates a mindset (Wyer & Xu, 2010) unique to individuals who have experienced a lot of diversity.

A further study therefore attempted to replicate the findings from Study 1 and to investigate possible boundary conditions of the effect. It was tested whether participants with a lot of exposure to diversity would always report weaker delay gratification or only when diversity was salient for them. In other words, this study investigated whether the effect of exposure to diversity on delay gratification was moderated by the salience of diversity. In this study, participants were reminded of their experiences of diversity simply through the questions about their exposure to diversity used in Study 1. These questions were presented either before or after participants completed questionnaires measuring their ability to delay gratification and general impulsiveness.

4.3.1 Methods

Participants. For this study, 151 White British participants were recruited at the University of Sheffield in the same fashion as for Study 1. Participants were randomly assigned to one of two conditions (diversity salience or control). In the diversity salience condition, participants were reminded of their experiences of diversity before they answered questions on their ability to delay gratification and general impulsiveness. To participate, the student's hometown had to be located in England, and the students had to access the survey from a non-mobile device. The participants (105 females, 46 males) were aged between 18 and 72 years ($M = 23.91$, $SD = 9.15$). Some participants had missing data. 144 participants provided data for all variables. Only participants with complete data on all variables were included in this analysis. Incomplete data had to be excluded since fitting a multivariate General Linear Model (the main analysis in this study) allows only for a list-wise deletion of missing data.

Procedure and materials. Materials were identical to Study 1. However, the order in which these materials were presented to participants depended on the condition.

Diversity salience condition. The procedure for this condition was identical to Study 1. That is, participants first received demographic questions and questions about their exposure to diversity. This served to make diversity salient. Subsequently, participants completed the ADOG and BIS-Brief.

Control condition. In the control condition, participants first received the ADOG and BIS-Brief, and only then proceeded to respond on demographic questions and questions about their exposure to diversity.

4.3.2 Results

In theory, the data could be nested within the geographic area of participants' home districts. However, multilevel analysis might be unnecessary if the underestimation

of standard errors due to clustering is relatively low (Maas & Hox, 2005). In this case a conventional unilevel analysis is still likely to produce unbiased estimators. The underestimation of the standard error due to clustering can be specified by the design effect (Maas & Hox, 2005; Muthen & Satorra, 1995). The design effect can be understood as the ratio of the actual variance, under the sampling method used, compared to the variance computed under the assumption of simple random sampling. A design effect of three would thus indicate that the sample variance is three times bigger than it would have been if the sampling would have been perfectly random (Sturgis, 2004). A design effect below two is generally considered small, indicating that a conventional unilevel analysis is acceptable and should not lead to overly misleading results (Maas & Hox, 2005; Muthen & Satorra, 1995). Design effects for the dependent variables were small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.29$). Therefore, a multilevel analysis was not conducted.

All statistical tests were carried out with a level of significance of $\alpha = .05$. All results were controlled for gender, age, subjective SES, and communal SES.

Outlier exclusion and data inspection. Participants that took an unusually long time to complete the questionnaire were excluded. This was done to ensure that participants paid sufficient attention to the questions and that the manipulation of diversity salience would be effective. Using Tukey's method (Tukey, 1977), participants were excluded if they scored three times the interquartile range above the third quartile on study duration. The median time in minutes for completing the study was $Mdn = 7$. Participants were excluded from analysis if they scored three times the interquartile range, $IQR = 4$, above the third quartile, $Q3 = 10$. Therefore, all participants taking longer than

22 minutes were omitted from analysis. This led to the exclusion of seven participants with 137 remaining participants (132 provided data for all variables).⁶

Data inspection revealed that diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for diversity.

Inferential analysis. To examine the effect of the diversity condition and exposure to diversity on delay gratification and general impulsiveness a multivariate General Linear Model (GLM) was fitted to the data. ADOG and BIS-Brief scores were entered into the model as dependent variables, and condition and exposure to diversity were used as predictors. The condition*diversity interaction term was also added to the model as a predictor.

There was no significant multivariate main effect for exposure to diversity, *Willk's* $\Lambda = 0.97$, $F(2, 123) = 1.92$, $p = .15$. Diversity salience, however, showed a multivariate main effect across conditions, *Willk's* $\Lambda = 0.95$, $F(2, 123) = 3.32$, $p = .04$, *partial* $\eta^2 = .05$. This main effect of diversity salience was qualified by a multivariate interaction effect of diversity salience with diversity exposure, *Willk's* $\Lambda = 0.95$, $F(2, 123) = 3.23$, $p = .04$, *partial* $\eta^2 = .05$. These significant multivariate effects were followed up on by univariate tests to investigate which of the dependent variables contributed to the multivariate effects.

⁶ Conclusion changed slightly when outliers were included in the analysis, in the sense that the multivariate diversity salience*diversity exposure interaction effect was only marginally significant, *Willk's* $\Lambda = 0.96$, $F(2, 135) = 2.59$, $p = .08$, *partial* $\eta^2 = .04$. Univariate results with outliers included, showed a significant salience*diversity interaction, $F(1, 136) = 5.08$, $p = .03$, *partial* $\eta^2 = .04$ for BIS, but no such effect for ADOG, $F(1, 136) = 1.99$, $p = .16$, *partial* $\eta^2 = .01$.

Univariate results were obtained by fitting separate univariate GLMs for ADOG and BIS-Brief with the same predictors as for the multivariate analysis.

ADOG. The salience of diversity lead to reports of stronger delay gratification, $F(1, 124) = 6.31, p = .01, \text{partial } \eta^2 = .05$. This main effect was qualified by a significant diversity salience*diversity exposure interaction, $F(1, 124) = 5.96, p = .02, \text{partial } \eta^2 = .05$. This interaction was further investigated by performing a moderation analysis in PROCESS (Hayes, 2013). There was no reliable effect of diversity on ADOG in the control condition, *standardised effect* = .08, $t(124) = .68, p = .50, 95\% \text{ CI } [-.16, .33]$. When diversity was salient, however, diversity predicted weaker delay gratification, *standardised effect* = -.36, $t(124) = -2.68, p = .01, 95\% \text{ CI } [-.63, -.09]$. These findings thus confirm the marginal detrimental effect of diversity on delay gratification observed in Study 1. However, it also qualifies this finding in the sense that it was only present when diversity was salient.

BIS-Brief. The salience of diversity predicted marginally lower scores for impulsiveness, $F(1, 124) = 3.54, p = .06, \text{partial } \eta^2 = .03$. This trend was also qualified by a marginally significant interaction effect of diversity salience*diversity exposure, $F(1, 124) = 3.77, p = .054, \text{partial } \eta^2 = .03$. This interaction effect was also further investigated by performing a moderation analysis. Diversity did not have any reliable effect on impulsiveness in the control condition, *standardised effect* = -.01, $t(125) = -.04, p = .97, 95\% \text{ CI } [-.25, .24]$. However, diversity predicted higher impulsiveness when diversity was salient, *standardised effect* = .36, $t(125) = 2.69, p = .01, 95\% \text{ CI } [.10, .63]$. The effect of exposure to diversity on delay gratification found in Study 1 was therefore

replicated and this time extended to measures of impulsiveness as well, but only when diversity was salient. These moderation effects are also displayed in Figure 1.

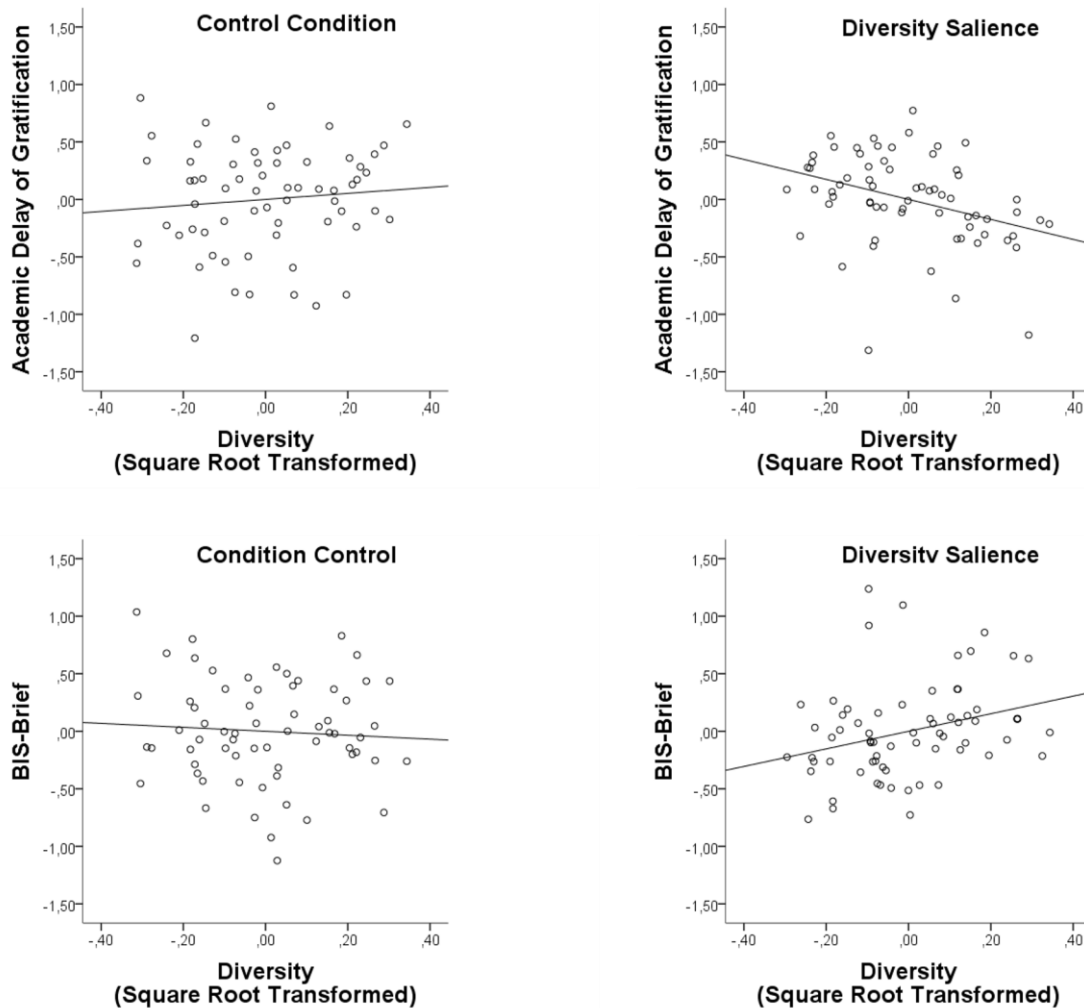


Figure 1. Partial regression plots of exposure to diversity and Academic Delay of Gratification (ADOG) as well as Barratt Impulsiveness Scale-Brief scores (BIS-Brief) with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES and communal SES).

Power analysis. I evaluated the ability of this study to detect a multivariate interaction effect of diversity salience and diversity experiences on the dependent variables by calculating the level of statistical power. Given the small effect size obtained

in Study 1, I calculated the power for an assumed effect size of $\eta^2 = .03$. The post-hoc power for this study was $power = .40$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .07$ at $power = .80$.

4.3.3 Discussion

When diversity was salient, participants who came from ethnically diverse environments were more likely to prefer immediate gratification and to report marginally stronger impulsiveness. Under neutral conditions, exposure to diversity had no influence on delay gratification or impulsiveness. These findings replicate and qualifies the effect of diversity on self-regulation present as a trend in Study 1. Past experiences of diversity thus do seem to affect self-regulation, but only under when diversity is salient (i.e. when social diversity is likely to be present).

The fact that self-regulation only appears to be weakened when diversity is salient indicates that this might be the result of an alternative strategy to handle information related to diversity. Crisp and Meleady (2012) suggested that an adaptive strategy for processing diversity needs to involve (a) the inhibition of category representation in favour of (b) generative thinking which ultimately results in the creative reconstrual of the combination of social categories. Creative performance has been found to be higher among individuals who have experienced a lot of diversity (Cheng et al., 2011; Leung & Chiu, 2010; Tadmor, Satterstrom, et al., 2012), and spontaneous exposure to social diversity (Cheng & Leung, 2013; Cheng et al., 2011) or counter-stereotypes (Gocłowska et al., 2012; Gocłowska & Crisp, 2013) has been found to increase creative performance. However, results from this study could suggest that maybe cognitive inhibition is not as crucial to generative thought about diversity as originally thought. The weakening of self-control might therefore represent a trade-off necessary to boost other cognitive processes

like divergent thinking or an artefact caused by other processes that aid the divergent thinking process.

It was also found that the salience of diversity itself had a positive main effect on delay gratification. This is in parallel to recent findings showing that thinking about counter-stereotypes can temporarily lead to enhanced inhibitory control on the Stroop task (Vasiljevic & Crisp, 2013). Exposure to counter-stereotypes is one example of diversifying experience so just thinking about ethnic diversity in general might have similar (if weaker) effects. However, the presence of an interaction effect with diversity salience makes a straight-forward interpretation of this main effect difficult.

To sum up, two experiments provided evidence that participants who had been exposed to more ethnic diversity were more likely to report weaker self-regulation. This is initial evidence that diversity might affect self-regulation. Study 2 also demonstrated that this effect only holds if diversity is salient. The salience of diversity might have made individuals with a lot of diversity experience anticipate processing diversity related stimuli. It might also have activated memories of past experiences of diversity, which might have put them into a mode for processing further diversity. As discussed above, an increase in impulsive tendencies in this mode might be a necessary trade-off to ensure optimal processing of information related to diversity. In any case, past experiences of diversity seem to only hinder self-control when diversity is salient and have no effects under neutral conditions.

An important limitation of the first studies was that self-regulation was measured purely by self-report. That means that it is unclear if the effect of salient diversity only affects self-reports of impulsiveness or actual behaviour as well. It is possible that, for whatever reason, participants who have experienced a lot of diversity place less emphasis on *appearing* self-controlled when diversity is made salient. Their actual ability to self-

regulate, however, might not be affected at all. To explore whether salient diversity does indeed affect self-control 'in action', a further study was conducted in which the Stroop task was employed as a test of self-regulation.

4.4 Study 3: Positive Contact and Behavioural Effects on Self-Regulation

A further study explored if experiences of diversity and the salience of diversity do indeed affect self-regulatory behaviour or if they only affect participants' subjective notion of their self-regulatory ability. This study therefore included both behavioural as well as self-report measures of self-regulation. Participants completed the Stroop task (MacLeod, 1991) alongside self-report measures of impulsiveness. Self-report measures included the 15 item short version of the Barratt Impulsiveness Scale (BIS 15; Spinella, 2007) and the Monetary choice questionnaire (MCQ; Kirby & Maraković, 1996; Kirby, Petry, & Bickel, 1999).

Furthermore, it was explored what kind of experiences of diversity might lead to changes in self-regulatory ability. The previous studies showed that mere exposure to ethnic diversity predicts self-regulation when diversity is salient. However, it might not necessarily be mere exposure to diversity alone that leads to cognitive change. The CPAG model (Crisp & Turner, 2011) assumes that cognitive adaptation to diversity requires the repeated experience of stereotypic inconsistencies as well as the motivation and ability to process these. While ethnically diverse environments might provide several instances of stereotypic inconsistencies, they might not always provide the ideal conditions for processing these stimuli. Specifically, ethnic diversity can promote negative as well as positive interethnic contact (Koopmans & Veit, 2014). Negative contact is usually accompanied by feelings of threat and intergroup anxiety (Pettigrew, 2008; Stephan & Stephan, 1985, 1989; Stephan et al., 2002), and anxiety is known to deplete cognitive resources (Easterbrook, 1959; Kahneman, 1973). Negative contact is therefore unlikely

to provide ideal conditions for processing stereotypical inconsistencies. Positive contact, on the other hand, should provide more ideal conditions to promote processing stereotypical inconsistencies and ultimately cognitive change: Positive contact reduces feeling of intergroup anxiety, and is accompanied by positive affect (Pettigrew, 1998; Stephan & Stephan, 1985). Positive mood is associated with enhanced creative performance (Baas, De Dreu, & Nijstad, 2008; Davis, 2009; Grawitch, Munz, Elliott, & Mathis, 2003), breadth of attention (Fredrickson & Branigan, 2005; Fredrickson, 1998; Rowe, Hirsh, & Anderson, 2007) and cognitive flexibility (Ashby, Isen, & Turken, 1999; Dreisbach & Goschke, 2004; Fredrickson, 1998; Murray, Sujan, Hirt, & Sujan, 1990). Since these are all factors that contribute to successful resolution of inconsistencies (Crisp & Turner, 2011), positive contact should provide ideal processing conditions for stimuli of stereotypical inconsistencies.

It was therefore expected that only positive intercultural contact should lead to cognitive change, because in such situation individuals should be free of cognitive load and experience positive affect. An effect of exposure to diversity on self-regulation should thus be mediated by positive contact.

4.4.1 Methods

Participants. For this study, 94 White British participants were recruited at the University of Sheffield. This study was carried out in the laboratory. Participants were randomly assigned to one of two conditions (diversity salience or control). In exchange for participation, participants were either rewarded with course credits or were entered a prize draw for vouchers for several British shops. In the diversity salience condition, participants were reminded of their experiences of diversity before they completed the self-regulation measures. To participate, the student's hometown had to be located in England. Furthermore, only data from White British participants was included in the

analysis. The participants (74 females, 20 males) were aged between 18 and 32 years ($M = 19.86$, $SD = 3.14$). One participant who had missing data was excluded, leaving 93 participants who provided data for all variables.

Procedure and materials. As in the previous two studies, participants received demographic questions and questions on their early exposure to diversity. They also completed questions on the amount of positive interethnic contact they experienced. This study also investigated if current diversity would have any influence on self-regulation. For this reason, questions on participant's subjective exposure to diversity and positive contact during the last 6 months were added. In addition, they completed various measures tapping into their ability to self-regulate. These were the Stroop, the BIS-15, and the monetary choice questionnaire. As in the previous study, the order of the measures differed depending on the condition.

Current subjective diversity. The current subjective exposure to diversity was measured similarly to subjective exposure to diversity for participant's home district. Participants were asked to estimate the proportion of students in their university belonging to each of the major ethnic groups. They were then asked to make the same estimate for the neighbourhood they were currently living in. These questions are reported in Appendix I.

For both questions, I used the Hirschman-Herfindahl index subtracted from unity (see Study 1) to derive an index for participants' present subjective exposure to diversity. The correlation for the two separate subjective indices was $r(92) = .44$, $p < .001$. Both indices were combined to create a single measure for subjective exposure to diversity.

As this study was conducted in the lab of the psychology department of the University of Sheffield, all participants can be assumed to have been living in the district of Sheffield at the time of the study. Census data on the current objective district diversity

was therefore assumed to be identical for all participants and was not used as a measure in this study.

Positive interethnic contact. Positive contact was measured through two questions: "How often did somebody help you that was from an ethnic background different from your own?" and "How often did you have interesting conversations with people from ethnic backgrounds different from your own?" (see Appendix H for the full scale). These questions were presented for the time when participants were growing up in their home area, as well as for the past six months. Each set of questions was preceded with the instruction to think of the appropriate time-period. The questions correlated strongly for the period participants spent in their home area ($r(92) = .72, p < .001$), as well as for the past six months ($r(92) = .73, p < .001$).

Self-regulation. Self-regulation was measured through behavioural measures as well as through self-report. Participants completed the Stroop, the BIS-15, and the monetary choice questionnaire.

Stroop. Participants completed a computerised version of the Stroop task. In the Stroop task participants have to classify the colour of words appearing on the screen by pressing a button (MacLeod, 1991). Possible colours were green, blue and red. The meaning of the words, however, represents one of these colours as well and does not necessarily have to match the actual colour of the word (i.e. the word 'blue' might appear in red, requiring a press of the red button). People generally tend to make more errors and need more time to react if the ink colour and word meaning are in mismatch. This interference is known as the Stroop effect. Smaller Stroop effects are considered to indicate better self-regulatory ability (Hagger, Wood, Stiff, & Chatzisarantis, 2010). After a short trial block, participants completed 5 blocks of the Stroop, each consisting of 3 congruent trials (25%) and 12 incongruent trials (75%). The target word was displayed

after an interstimulus interval of 500ms, and stayed on screen until a response was made. This experimental paradigm is displayed in Figure 2. Reaction times were trimmed and transformed based on procedures developed in previous work (Richeson & Shelton, 2003). All reaction times exceeding 2.5 standard deviations (1238 ms) were recorded as 1238ms, and reaction times less than 200ms were recorded as 200ms.

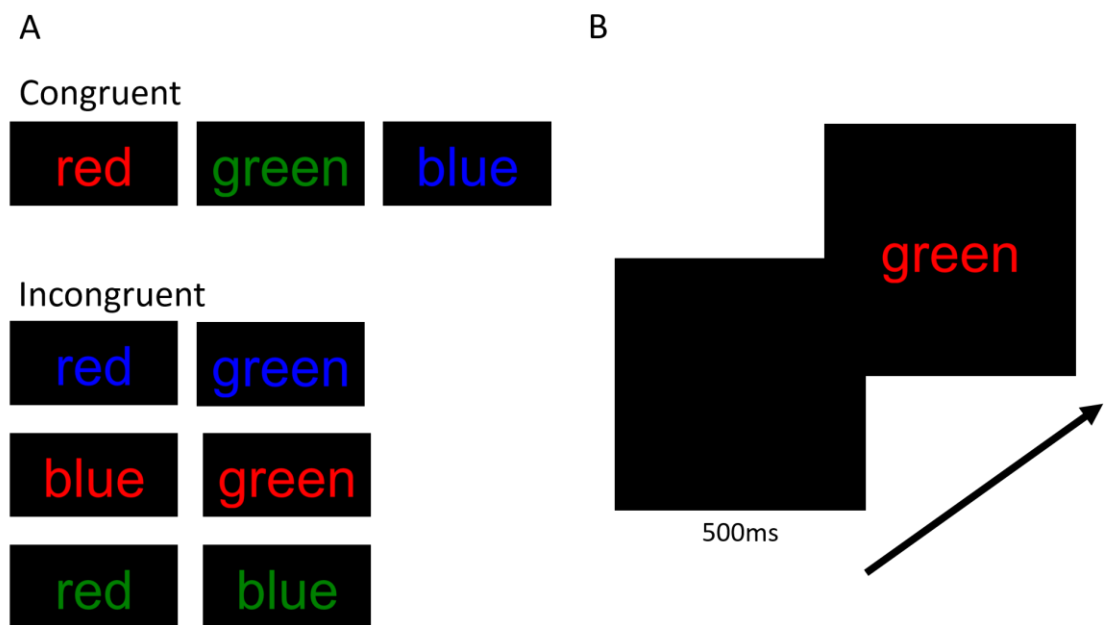


Figure 2. Experimental paradigm for the Stroop task. (A) On each trial, participants were either presented with congruent or incongruent stimuli. The task consisted of 5 blocks with 3 congruent trials (25%) and 12 incongruent trials (75%) each (75 trials total). (B) The stimulus was displayed after an interstimulus interval of 500ms, and stayed on screen until a response was made. For a correct response, participants had to correctly classify the colour of the word by pressing a button.

The performance on the Stroop was measured by the reaction time interference caused by Stroop trials. Stroop interference was calculated as the difference in reaction time between incongruent and congruent trials, corrected for overall reaction time (mean

RT incongruent trials - mean RT congruent trials) \ overall mean RT; Posner et al., 2002). Stroop interference in this study ranged from -.09 to .23 ($M = .04$, $SD = .08$).

15 item short version of the Barratt Impulsiveness Scale (BIS 15). In this study the BIS-Brief was exchanged for the 15 item short version of the Barratt Impulsiveness Scale (BIS 15; Spinella, 2007). Like the BIS-Brief, the BIS 15 is a short version of the 11th revision of the Barratt Impulsiveness Scale (Patton, Stanford, & Barratt, 1995). In contrast to the BIS-Brief it also allows for a more fine-grained measurement of impulsiveness through three subscales (non-planning impulsivity, motor impulsivity, attentional impulsivity). The three subscales are measured by 5 items each, scored on a Likert-scale from 1 (*rarely/never*) to 4 (*almost always/always*). The full scale is reported in Appendix J. For this sample motor and non-planning impulsivity showed acceptable internal consistency (*Cronbach's* $\alpha > .75$). However, internal consistency of attentional impulsivity, was poor (*Cronbach's* $\alpha = .58$). The scale's internal consistency as a whole was good (*Cronbach's* $\alpha = .82$). In other words, the BIS-15 seemed to be a more internally reliable indicator of impulsiveness as a univariate construct than for more fine-grained facets of impulsiveness. It was therefore planned to test for effects on impulsiveness as a univariate factor first, and to follow up testing for effects on the subscales only in the case of significant findings.

Monetary Choice Questionnaire (MCQ). The monetary choice questionnaire can be used to measure participant's ability to delay immediate gratification for a larger reward later on (Kirby & Maraković, 1996; Kirby et al., 1999). More specifically, this questionnaire measures participant's discount rate for future monetary rewards. Participants with a higher discount rate will assign a lower value to future rewards, and therefore tend to prefer smaller immediate monetary rewards to larger rewards later in the future.

This questionnaire presents participants with 27 hypothetical choices between a smaller immediate reward and a larger delayed reward. For example, on one of the items participants are asked 'would you prefer £54 today, or £55 in 117 days?'. The questions vary in the amount of the immediate monetary reward, the delayed monetary reward as well as in the amount of time participants would have to wait. The full scale is reported in Appendix K. For each participant, an estimate of the participant's discount rate parameter k was computed, using the geometric mean of all trials. This was done by making use of the automated scoring sheet provided by Kaplan et al. (2014). A higher value of k indicates a poorer ability to delay gratification.

Conditions. Participants were randomly allocated to either the control or diversity salience condition, determining the order in which the materials were presented to them.

Diversity salience condition. In the diversity salience condition, participants first received questions about their exposure to diversity and positive interethnic contact. This served as a prime for their experiences of diversity. Subsequently participants completed the Stroop, BIS 15 and MCQ. Finally, participants answered demographic questions.

Control Condition. In the control condition, participants completed the Self-Regulation measures (Stroop, BIS 15 and MCQ) first, and only then proceeded to respond to questions about their exposure to diversity and positive contact. Finally, participants answered demographic questions.

4.4.2 Results

As in Study 2, I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.81$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of $\alpha = .05$. All results, except for correlations, were controlled for gender,

age, subjective SES and communal SES. Since this study was conducted in the laboratory it could be made sure that all participants paid sufficient attention to the material, and therefore no outliers were excluded from analysis.

Data inspection. Data inspection revealed that early exposure to diversity had a slightly non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. In contrast, current subjective exposure to diversity showed a non-normal, negatively skewed distribution. The distribution could be improved by performing a square transformation on the data. The following analysis was therefore carried out with the square root transformed data for early diversity and square transformation for current subjective diversity. Means and standard deviations are reported for untransformed data for ease of interpretation.

Correlations of diversity and contact measures. The correlations between the different measures of experiences of diversity are displayed in Table 7. Early diversity was correlated with early positive contact, $r(91) = .27, p = .01$. This might represent the fact that growing up in an ethnically diverse environment creates opportunity to engage with people from other ethnicities in a positive way.

Surprisingly, current subjective exposure to diversity was uncorrelated with current contact, $r(92) = -.09, p = .41$. Current positive contact was also not correlated with prior positive contact, $r(92) = .12, p = .27$. However, current contact was strongly correlated with early diversity, $r(91) = .56, p < .001$. This was an unexpected finding, but it points to the possibility that early exposure to diversity might be a crucial factor to lower the barrier for future attempts to seek intercultural contact.

Table 7

Intercorrelations, Means and Standard Deviations of Diversity Measures in Study 3

Variable	1	2	3	M	SD
1. Early Diversity	-			-.10	.82
2. Current Subjective Diversity	.13 (91)	-		.60	.13
3. Early Positive Contact	.27* (91)	.03 (92)	-	3.60	1.02
4. Current Positive Contact	.56*** (91)	-.09 (92)	.12 (92)	3.05	1.17

Note: Degrees of freedom for significance tests are given in parenthesis.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Correlations between self-regulation measures. The correlations between the different self-regulation measures are displayed in Table 8. Stroop interference was unrelated to all other measures of self-regulation. A high discount rate was associated with the non-planning facet of impulsiveness, $r(92) = .22, p = .03$, reflecting the cognitive nature of delay gratification. Stroop interference was uncorrelated with discount rate, $r(92) = -.12, p = .23$ and BIS-15, $r_s < .03, p_s > .85$. It is not clear why Stroop performance was not correlated with other measures of self-regulation. This finding is in conflict with previous results which found Stroop interference and BIS scores to be moderately correlated (Enticott et al., 2006). Given the fact that the BIS-15 and MCQ were administered last it is possible that fatigue might have affected these measures, even though the BIS-15 seems to at least provide internal reliability.

Table 8

Intercorrelations, Means and Standard Deviations of Self-Regulation Measures in Study

3

Variable	1	2	3	4	5	6	M	SD
1. Stroop Interference	-						.04	.08
2. Discount Rate <i>k</i>	-.12	-					.02	.05
3. BIS-15: Total	.01	.13	-				2.27	.42
4. BIS-15: Motor	.02	.00	.80***	-			2.33	.56
5. BIS-15: Non-Planning	.01	.22*	.84***	.50***	-		2.18	.55
6. BIS-15: Attention	-.02	.10	.74***	.37***	.48***	-	2.31	.45

Note: Degrees of freedom for all significance tests was $df = 92$.

BIS-15 = 15 item short version of the Barratt Impulsiveness Scale

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Early experiences of diversity and self-regulation. To examine the effect of salient diversity and prior experiences of diversity on self-regulation, separate univariate General Linear Models (GLM) were fitted to the data for each dependent measure (Stroop interference, BIS-15 total score and discount rate). A multivariate GLM was deemed inappropriate since the correlation between the dependent variables was unexpectedly low (Verma, 2015). Predictors entered into all models were condition, early diversity, early positive contact as well as condition (control or diversity salience) and the two interaction terms of diversity and positive contact with condition.

Stroop performance. Diversity approached significance as a predictor of Stroop interference. It predicted marginally stronger Stroop interference across conditions, $F(1, 83) = 3.60, p = .06, partial \eta^2 = .04$. No main effects emerged for diversity salience or positive contact, $F_s < .72, p_s > .40$. Diversity salience and positive contact did, however, form a significant interaction term, $F(1, 83) = 4.83, p = .03, partial \eta^2 = .06$. To determine

the nature of this interaction effect, a moderation analysis was conducted in PROCESS. Positive contact had no reliable effect in the control condition, *standardised effect* = $-.17$, $t(83) = -1.24$, $p = .22$, 95% *CI* $[-.45, .10]$. When diversity was salient, however, positive contact predicted marginally stronger interference, *standardised effect* = $.29$, $t(83) = 1.77$, $p = .08$, 95% *CI* $[-.04, .62]$. This is a conceptual replication of the patterns in Study 1 and 2: Experience of diversity predicted weaker self-regulation when diversity was salient. The pattern for this interaction effect is also shown in Figure 3.

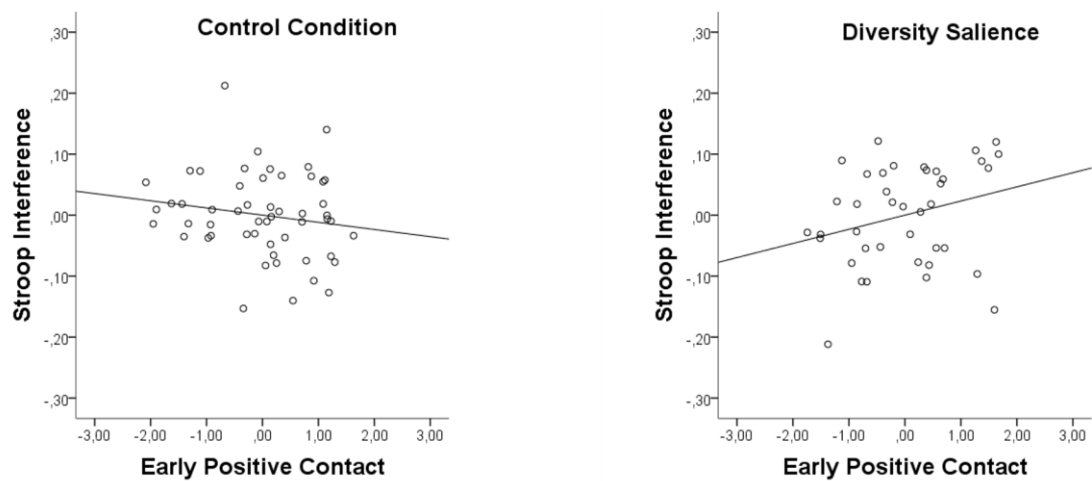


Figure 3. Partial regression plots of early positive contact and Stroop interference with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal SES) and early exposure to diversity.

Power analysis. The ability of this study to detect an interaction effect of diversity salience and diversity experiences on Stroop performance was evaluated by calculating the level of statistical power. The population effect size was estimated to be similar to the one found in Study 2, $\eta^2 = .05$. The power of this study for this population effect size was

$power = .59$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .08$ at $power = .80$.

Mediation analysis. To test for the presence of a mediation effect, bootstrapping procedures in PROCESS were used. More specifically, it was tested if any effect of subjective diversity on Stroop interference was mediated by positive contact. No indirect effect of diversity through frequency or quality of positive contact was found, *standardised effect* $< .01$. However, results from the GLM above indicated that effects through positive contact might be moderated by condition. Therefore, an additional analysis tested if a moderated mediation effect was present.

In a further analysis in PROCESS, it was tested if any effect of subjective diversity on Stroop interference was mediated by positive contact, and if this mediation was moderated by condition. As shown in Figure 4, there was evidence of mediated moderation with positive contact mediating the effect of diversity, *standardised index of moderated mediation* $= .12$, 95% CI [.01, .37]. The indirect effect of positive contact was moderated by condition, *coefficient for interaction* $= .47$, $t(83) = 2.14$, $p = .03$. The indirect effects per condition were not significant for both conditions, although the indirect effect of diversity on Stroop interference via positive contact was negative in the control condition, *standardised ab* $= -.05$, 95% CI [-.16, .004] and positive when diversity was salient, *standardised ab* $= .08$, 95% CI [-.02, .26]. This pattern would be consistent with the positive contact*diversity salience effect observed in the GLM described above (i.e. positive contact predicting worse Stroop performance only when diversity was salient). The remaining direct effect of diversity predicted higher Stroop interference (i.e. worse Stroop performance), *standardised c'* $= .23$, $t(83) = 2.01$, $p = .048$, 95% CI [.04, .42].

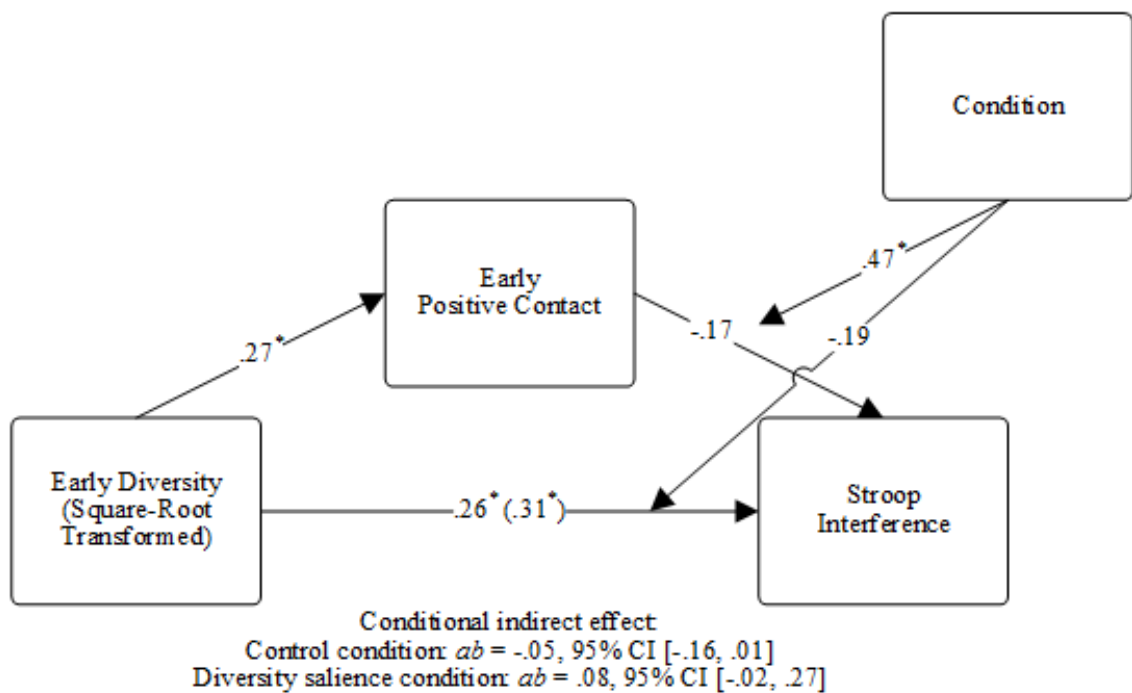


Figure 4. Relationship between early exposure to diversity and Stroop interference as mediated by early positive contact and moderated by condition. Coefficients are standardised, except for interaction effects with condition. All coefficients are controlled for control variables (age, gender, communal and subjective socioeconomic status). The regression coefficient between early diversity and Stroop interference, controlling for quality of early positive contact, is given in parenthesis. $^\dagger p < .10$ $^* p < .05$. $^{***} p < .001$

BIS-15. For impulsiveness as measured by the BIS-Brief, positive contact emerged as a marginal predictor across conditions, $F(1, 83) = 3.48$, $p = .07$, partial $\eta^2 = .04$, $\beta = .23$ with positive contact predicting self-reports of stronger impulsiveness. Following up with separate GLMs for each subscale (motor, non-planning and attention), revealed that the effect was mostly driven by a marginal increase in motor impulsiveness, $F(1, 83) = 3.13$, $p = .08$, partial $\eta^2 = .04$, $\beta = .15$. Positive contact had no reliable effects on the other two subscales, $F_s < 1.9$, $p_s > .17$.

Delay gratification. No reliable main or interaction effects on discount rate emerged from the analysis, $F_s < .81$, $p_s > .37$.

Current experiences of diversity. The effect of salient diversity and recent diversity experiences on self-regulation was investigated in the same manner as for prior diversity experiences by fitting separate univariate General Linear Models (GLM) for each dependent variable (Stroop interference, BIS-15 Total Score, discount rate parameter k). Predictors entered into all models were condition, subjective diversity and positive contact of the past 6 months, as well as both interaction terms with condition.

The only effect emerging from the analysis was a marginally significant main effect of current positive contact on the discount rate for delay gratification, $F(1, 83) = 2.98$, $p = .09$, $partial \eta^2 = .04$, $\beta = .33$, with positive contact predicting a marginally higher discount rate (indicating worse self-regulation). No other reliable effects emerged from analysis, $F_s < 2.31$, $p_s > .13$.

4.4.3 Discussion

When diversity was made salient, participants who had made a lot of positive contact in the past took marginally longer to react to Stroop trials. This was a significant interaction between diversity salience and positive contact. Results therefore showed that a) the effect of diversity on self-regulation found in Study 1 and 2 does indeed affect self-regulatory behaviour and not just self-reports, and b) positive contact plays an important role in explaining the effects of diversity.

Furthermore, this moderation between diversity salience and positive contact seems to be part of a mediated moderation. In this mediated moderation diversity affected positive contact which in turn affected self-regulation, with the direction of the effect depending on condition. The effects of positive contact separated per condition were not

significant, but this issue might be due to sample size. Either way the effect of positive contact seems to change its direction when diversity is made salient.

Marginal effects of positive contact were found for some dependent variables without an interaction effect present. This might indicate a debilitating effect on self-regulation. While these effects did not reach significance, it is worth noting that these effects seemed to be specific to positive contact, and not general exposure to diversity. This might point to the possibility that the long-term response to positive contact involves a general weakening of self-regulation as well. However, since this is essentially a correlational finding (i.e. it is not affected by the experimental condition) it might also indicate that a slight amount of impulsiveness and spontaneity makes positive diversifying encounters more likely.

To sum up, the effects of diversity were moderated by salient diversity. Positive contact partially mediates these effects, generally predicting worse Stroop performance only when diversity was made salient.

4.5 General Discussion

The three studies reported in this chapter tested the hypothesis that prolonged experiences of diversity would be associated with enhanced self-regulation. This prediction was derived from the assumption that experiences of ethnic diversity should require the suppression of stereotypical content. Since suppressing stereotypes relies on self-regulation, it was predicted that experiences of ethnic diversity should lead to cognitive change in the form of improved self-regulatory ability to enable efficient suppression of stereotypical information.

Preliminary results of a pilot study and findings from Studies 1-3 appear to contradict this hypothesis. Across all studies it was found that experiences of diversity appear to impair self-regulation when diversity is made salient. Results from Study 1

suggested that exposure to diversity is linked to self-reports of low self-regulation. This finding was replicated in Study 2, but Study 2 also revealed an important boundary condition of this effect: Participants with a lot of exposure to ethnic diversity only reported low levels of self-regulation when diversity was brought to mind. This effect of diversity also seems to impact behavioural measures of self-regulation such as the Stroop task, as was demonstrated in Study 3. To summarise these findings, it was found that experiences of diversity were associated with indicators of poor self-regulation, but only when social diversity was made salient.⁷

Salient diversity represents situations in which social diversity is likely to be present. We should therefore expect that responses patterns to diversity are especially likely to be activated when social diversity is salient. The fact that salient diversity moderates the effect of diversity experiences on self-regulation thus suggests that this mechanism is part of a cognitive response to diversity.

This might indicate that participants activate a particular mindset when they process diversity, and that some aspects of this mindset are linked to impulsiveness, a preference for immediate rewards (Study 1 & Study 2), and slower reaction times on tasks that require reacting to inconsistent information (Study 3). These findings are in contrast to what one might expect given that inhibiting stereotypes requires cognitive control (Bartholow & Dickter, 2008; Bartholow, 2010), and inhibition of stereotypical information was thought to be a key component in resolving stereotypical inconsistencies (Crisp & Turner, 2011).

⁷ These findings are also supported by a meta-analysis of all studies on diversity experiences and self-regulation. This meta-analysis is reported in Chapter 8, together with meta-analyses of other effects reported in this thesis. Generally, salient diversity was found to moderate the effect of diversity experiences on self-regulation. When diversity was salient, the mean effect of diversity on self-regulation over all studies was $r = -.16, p = .002$. No effect was present when diversity was not salient, $r = .06, p = .45$.

This begs the question why such a mindset should be activated in the first place. If individuals develop a mindset to adapt to diversity, it ultimately would have to allow for more efficient inconsistency resolution. The current results indicate that inhibition might not be essential for this process. A more vital aspect to inconsistency resolution might be forming unconventional connections between conflicting information. This might require temporarily down-regulating the motivation to monitor cognitive "rules" or schemas (DiMaggio, 1997) in general, including stereotypical information or behavioural rules (norms). A willingness to break some rules, including norms, has been suggested to be part of creative thinking (Gino & Wiltermuth, 2014). Being open to unconventional ways of thinking might help understanding diversity but might be at odds with monitoring the adherence to behavioural rules. Such a strengthened motivation to disregard categorical rules would represent a change in motivational and attentional focus rather than a decrease in self-regulatory ability, even at the cost of weak self-regulatory performance. That is, findings that appear to indicate impaired self-regulation in Studies 1-3 might have been caused by a temporarily lowered motivation to monitor cognitive rules. This idea will be further explored in the following Chapter.

CHAPTER 5: ADAPTATION TO DIVERSITY THROUGH NON-CATEGORICAL THINKING

In this chapter, I revisit the theoretical framework developed in Chapter 2 and 3 and integrate it with the implications of the findings reported in Chapter 4. I argue that the temporary decrease in cognitive control observed in Chapter 4 might represent the activation of a mindset that is characterised by a low reliance on cognitive rules and categories. As a by-product of this flexible stance towards cognitive rules, scripts and norms, the monitoring of conflicts with behavioural rules can be impaired as well, leading to poor self-regulation under some circumstances. In other words, individuals who have experienced a lot of diversity might, under certain conditions, lean towards abandoning categorical thinking in favour of more unconventional and divergent thinking. I will discuss how this hypothesis is supported by research on diversity and divergent thinking and show how a revised version of the CPAG model can integrate previous research with the findings reported in Chapter 4.

In Chapter 2 I have argued that the unprecedented rise of ethnic diversity in Western societies will lead to new cognitive challenges for all members of society, and I have shown that these challenges can be characterized as conflicts of information about social categories. Per the CPAG model (Crisp & Turner, 2011), resolving such conflicts requires stereotype inhibition as well as generative thought. Diversity might therefore offer the opportunity to improve both processes. However, while improvements in creative thought from experiences of diversity have been demonstrated in research, little is known about benefits for cognitive control. In Chapter 3 I have shown that inhibiting stereotypical information requires processes of cognitive control which are active in other

non-social tasks of self-regulation as well. Regular practice of such self-regulation tasks, social or non-social, has been shown to improve the capacity for cognitive control (Baumeister et al., 2006; Denson et al., 2011; Finkel et al., 2009; Gailliot, Plant, et al., 2007; S. A. Hui et al., 2009; Muraven et al., 1999; Muraven, 2010a, 2010b; Oaten & Cheng, 2006). It was therefore postulated that repeated experiences of diversity should provide the opportunity to improve self-regulatory capacity, because it should frequently call upon these processes. It was thus predicted that exposure to diversity should be associated with better self-regulation. This prediction was tested in three studies reported in Chapter 4.

The findings described in Chapter 4 demonstrated how experiences of diversity do indeed influence individuals' self-regulatory performance if diversity was made salient. However, the direction of this effect was unexpected: Participants who had experienced a lot of diversity displayed a *decrease* in self-regulatory performance when diversity was salient, rather than the expected increase. This was an unexpected finding because the CPAG model predicts that inhibitory control is required to suppress stereotypical thought when resolving stereotypical inconsistencies (Crisp & Turner, 2011). Processing stereotypical inconsistencies should be a common task in ethnically diverse environments so there should be frequent opportunities to engage in and improve inhibitory control (also see Chapter 3). The fact that repeated exposure to diversity seems to decrease self-regulation when diversity is salient was therefore surprising. This suggests that improved cognitive control might not be crucial for understanding socially diverse stimuli, at least not for people adapted to diversity. To understand the implications of these findings for the CPAG model it is important to carefully re-evaluate the assumptions made within this model in regard to diversity and stereotype inhibition. In this chapter, I will re-examine

the CPAG model and integrate it with the findings reported in the previous chapter as well as previous research.

5.1 Revisiting the CPAG Model

The CPAG model (Crisp & Turner, 2011) made a novel contribution to the research on the psychological effects of diversity by presenting a coherent and comprehensive model of how a whole range of experiences of diversity can lead to stereotypical inconsistencies, and how these inconsistencies are resolved. Based on these observations the CPAG model postulates how repeated experiences of diversity can lead to benefits for cognitive flexibility. Within the CPAG model, experiences of diversity are assumed to be cognitively challenging if they contain information that mismatch stereotypes. In Chapter 2 I have argued that this could be more broadly conceptualised as conflicts of cognitive categories. Per the CPAG model, conflicts of social categories instigate a process of inconsistency resolution if the perceiver of the conflict is motivated and able to untangle the inconsistency. This process involves the suppression of stereotypical information and generative thought. It is assumed to become more efficient with practice, primarily through improved stereotype suppression, which is assumed to eventually generalise to other tasks that require the resolution of conflicting categorical information. The result of this increased efficiency in dealing with categorical inconsistencies is improved cognitive flexibility. Cognitive flexibility in the context of the CPAG model can be understood as the ability to think about cognitive categories in a flexible and efficient way.

The idea that diversity leads to enhanced flexibility and divergent thought is supported by studies with bicultural individuals who are more cognitively flexible (Gutierrez & Sameroff, 2008; Tadmor, Galinsky, et al., 2012), as well as by studies

showing that multicultural experiences can boost creative thinking (Leung & Chiu, 2010; Leung et al., 2008; Maddux et al., 2010).

Furthermore, if this superior ability for flexible and divergent thinking does indeed help individuals to resolve conflicts of categorical information, we should also expect participants who have experienced a lot of diversity to display greater efficiency in acknowledging and integrating conflicting perspectives. Thus, participants with a lot of diversity experience should also display greater cognitive complexity. This does indeed seem to be the case, as demonstrated by studies in which cognitive complexity was found to be higher among biculturals (Benet-Martínez et al., 2006; Tadmor et al., 2009), and among participants with strong multicultural engagement during their MBA training (Maddux, Bivolaru, Hafenbrack, Tadmor & Galinsky, 2014).

However, while these studies do offer evidence for increased cognitive flexibility and complexity in dealing with cognitive categories among participants with diversity experience, they do not directly test the assumption that this improvement stems from enhanced inhibition. A key assumption within the CPAG model is that repeated experiences of diversity ultimately lead to improved cognitive flexibility through enhanced inhibitory control. Since experiences of diversity did not lead to greater self-regulation in Studies 1 to 3, it seems sensible to review its role within the CPAG model.

5.1.1 The Role of Self-Regulation Within the CPAG Model

As described above, the CPAG model assumes that repeated experiences of diversity lead to enhanced inhibitory control which in turn allows for greater cognitive flexibility and more divergent thinking when dealing with categorical inconsistencies. This hypothesis rests on the assumption that inhibition is a prerequisite for the efficient resolution of categorical inconsistencies. The CPAG model assumes that stereotypical inconsistencies are resolved by inhibiting the stereotypical information to then enable

divergent thinking and the generation of emergent attributes that resolve the categorical contradictions.

Inhibition does indeed seem to play a role for inconsistency resolution, as indicated by slower reaction times to constituent attributes for surprising category combinations when compared to unsurprising category combinations (Hutter & Crisp, 2006). Furthermore, participants who generated a list of counter-stereotypes showed superior inhibitory control in a subsequent Stroop task (Vasiljevic & Crisp, 2013). This finding also signifies that, for most people, processing surprising category combinations increases the tendency to inhibit categorical content. Therefore, the default strategy in dealing with categorical inconsistencies seems to be to first inhibit the categorical content and to then think divergently about the category combination.

While the default strategy for processing categorical conflicts relies on cognitive inhibition, this does not mean that people who are experienced in resolving categorical inconsistencies (e.g. through experiences of diversity) necessarily use the same strategy. A more efficient strategy would be learning when to forego activation of the categorical content in the first place so that engaging in inhibitory control becomes unnecessary. If diversity should lead to the acquisition of such a superior strategy it could aid the resolution of categorical conflicts and could therefore account for findings showing that prolonged experiences of diversity lead to enhanced divergent thinking (Leung & Chiu, 2010; Maddux et al., 2010; Maddux & Galinsky, 2009; Steffens et al., 2015; Tadmor, Galinsky, et al., 2012) and cognitive complexity (Benet-Martínez et al., 2006; Tadmor et al., 2009; Maddux, Bivolaru, Hafenbrack, Tadmor & Galinsky, 2014). In the following, I will expand on this argument by reviewing research on the impact of diversity on divergent thinking and creativity. I will show how the cognitive response to social diversity can be best characterised as the activation of a mindset that involves flexible

boundaries between categories. This cognitive change results in cognitive flexibility when handling categorical inconsistencies which aids the ability to think divergently (i.e. outside of conventional categorical boundaries.).

5.1.2 Diversity and Divergent Thinking

There is plentiful empirical evidence suggesting that social diversity does benefit cognitive flexibility and divergent thinking. Studies in this line of research have investigated both the influence of experiences of diversity that were temporarily induced in the laboratory as well as the impact of prolonged experiences of diversity that were part of participants' life experiences.

The impact of spontaneous experiences of diversity on divergent thinking.

Inducing experiences of diversity in the laboratory provides the opportunity to isolate the types of processes that are stimulated and enhanced during and after the processing of diversity through clear experimental designs. It should be kept in mind that this kind of studies alone cannot determine the long-term psychological changes that result from frequent experiences of diversity. What these studies can provide on their own, however, is a deeper understanding of the cognitive operations active in processing diversity and clear evidence for causal relationships with diversity.

One way of inducing experiences of diversity in the laboratory is by letting participants process surprising combinations of social categories, also called counter-stereotypes (Hastie et al., 1990; Kunda et al., 1990; Weber & Crocker, 1983). When asked to describe a counter-stereotypic person (e.g. *female mechanic*) participants have been found to show increased divergent creativity (Gołowska et al., 2012; Gołowska & Crisp, 2013). Similarly, when participants had to generate counter-stereotypical examples they subsequently generated more creative concepts and promotion material for a themed party night (Gołowska et al., 2012). This effect of counter-stereotypes on divergent thinking

seems to be moderated by need for personal structure, the tendency to think in relatively simple and clear structures: Presenting counter-stereotypes did only benefit divergent creativity for participants who were low in personal need for structure (Gocłowska & Crisp, 2013). This is noteworthy, since a clear sense of structure is usually enforced by relying on simplified cognitive categories (Neuberg & Newsom, 1993). These studies thus show that counter-stereotypes seem to only stimulate superior divergent thinking for participants with a low reliance on cognitive categories.

A different method of inducing experiences of diversity has been presenting symbols of different cultures together. For example, participants might be presented with a slide-show presenting cultural aspects associated with American or Chinese culture (e.g. arts, architecture or food). When participants were presented with a slide-show containing symbols of both American and Chinese culture they subsequently showed superior performance on creativity tasks than participants who had watched a slide-show containing cultural symbols of only American or only Chinese culture (Cheng et al., 2011; Leung & Chiu, 2010). Creative performance was also enhanced when participants had watched a slideshow containing stimuli that represented a fusion of American and Chinese culture (e.g. a McDonald's rice burger; Leung & Chiu, 2010). Creativity was thus enhanced when participants processed a dual exposure to American and Chinese cultural symbols. In these studies, the dual exposure occurred either by combining both cultures in the same slide-show or by presenting stimuli that fuses both cultures together. No matter how the dual exposure is achieved, it is likely to be perceived as a categorical inconsistency, because America and China harbour relatively distant cultures. These results could therefore mirror findings from studies which utilised counter-stereotypes. As for counter-stereotypes, cultural stimuli that contain conflicts of social categories seem to enhance creative performance.

Further analysis of dual cultural exposure has revealed that its beneficial influence on creative flexibility in the Unusual Uses Test (Guilford, 1959) is mediated by positive emotion (Cheng et al., 2011). Dual exposure to two psychologically distant cultures led to a decrease in positive emotion, and positive emotion was negatively related to creative flexibility. Thus, the greater the reduction of positive emotion caused by dual culture exposure the bigger the benefit for creative performance. This finding underscores that cultural diversity with categorical inconsistencies is likely to be experienced as cognitively challenging and therefore unpleasant, because the inconsistencies do not fit into common social categories (see Chapter 2). Furthermore, the fact that benefits for creativity were only observed under unpleasant dual cultural exposure indicates that environmental pressure (i.e. categorical inconsistencies) is necessary for a change in cognitive processes.

The idea that experiencing categorical inconsistencies are crucial to promote creative performance is further corroborated by a study manipulating the comparison mindset of participants (Cheng & Leung, 2013). In this study, dual presentation of symbols from two distant cultures (American and Chinese) only benefitted creative performance if participants were in a mindset that emphasises dissimilarities. Such a mindset should direct attention to potentially conflicting features of both cultures. Participants should therefore be more likely to experience categorical inconsistencies, and engage in a process of inconsistency resolution, promoting creative performance. If participants were in a mindset focussing on similarities no increase in creativity was observed. Creative performance was also not affected if the cultural symbols presented to the participants were from two cultures with low distance (Chinese and Indian).

To summarise, spontaneously experiencing diversity appears to benefit creativity. However, various findings indicate that experiences of diversity only promote creativity

if they contain conflicts between social categories, such as counter-stereotypes or simultaneous presentation of symbols from distant cultures. Similarly, being in a mindset that emphasises differences between stimuli is likely to bring categorical inconsistencies to mind and therefore promotes creativity when processing diversity. Furthermore, individuals who rely relatively little on cognitive categories as indicated by a low need in personal structure are most likely to improve in creativity performance after processing social diversity. This suggests that individuals with a low reliance on cognitive categories are most well-suited to think flexibly about categorical conflicts and are more likely to bring this cognitive flexibility to subsequent creativity tasks.

The impact of prolonged experiences of diversity on divergent thinking.

Rather than inducing experiences of diversity in the laboratory, some studies have investigated if social diversity as part of participants' life experiences affect divergent creativity. This approach lends itself well to study persistent cognitive changes caused by prolonged exposure to diversity. However, this type of research utilises variations in experiences of diversity in the population, and therefore must rely on semi-experimental or correlational methods. Thus, inferences about causal relationships are usually less conclusive. However, when this type of study is combined with findings from laboratory studies, converging evidence can pinpoint which cognitive processes should benefit from prolonged exposure to diversity.

Extended experiences of diversity can occur when a person is living abroad and interacting with foreign cultures. Time spent abroad has been found to predict performance in problem solving tasks requiring divergent thinking and creative flexibility such as the Duncker candle problem or finding a hidden solution in a negotiation task (Maddux & Galinsky, 2009). In contrast to time spent living abroad, time spent merely travelling abroad was not a significant predictor of creativity in these studies. While living

abroad often requires some degree of adaptation to the foreign culture, travelling a foreign country usually does not. Experiences of diversity should thus be more intense and frequent for participants who lived abroad. In support of this idea, the effect of time spent living abroad on creative problem-solving was mediated by cultural adaptation. In a similar vein, creative directors of major fashion houses with a lot of work experience abroad generate more innovative products (Godart et al., 2015), and paintings from well-travelled artists tend to sell for higher prices (Hellmanzik, 2013).

The beneficial effect of time spent abroad on creativity seems to be enhanced when experiences of living abroad or experiences of adapting to a foreign culture are made salient (Maddux et al., 2010; Maddux & Galinsky, 2009). This suggests that individuals who have frequently experienced diversity possess a mindset benefitting creative performance that is activated when diversity is salient.

Experiences of diversity are also especially prevalent among biculturals, members of the cultural minority who are influenced by both their minority culture and the majority culture (see Chapter 2). Asian American Individuals with high levels of identity integration have been found to come up with more original recipes, but only when Asian and American ingredients were presented to them simultaneously (Cheng et al., 2008). In this study, there was no impact of identity integration on originality when ingredients from only a single culture were present. The authors originally interpreted this finding as an effect of identity integration on creativity that is specific to tasks where knowledge about both social identities is relevant. However, this finding might also indicate that experiences of diversity only influences creativity in situations where diversity is salient. This reading of the findings is supported by results from Saad et al. (2013). In their study, Chinese American participants viewed cultural symbols from either American, Chinese or both cultures. When participants viewed both American and Chinese symbols, they

showed superior performance on the Unusual Uses Test, a divergent creativity task that is unrelated to cultural knowledge.

In a similar line of research, beneficial effects for divergent creativity were also found for having a large number of different social identities (Steffens et al., 2015).⁸ Participants who indicated that they belonged to many social groups came up with more names for a new kind of pasta and also scored higher on the Unusual Uses Test. This effect of multiple social identities on originality was mediated by cognitive flexibility. Thus, participants who identify with a lot of different social groups were more proficient in switching between different cognitive categories which allowed them to come up with more creative alternatives.

The level of diversity experiences can also be assessed by the Multicultural Experience Survey (MES; Leung & Chiu, 2010). This scale taps into different types of experiences of diversity such as time spent living abroad, speaking a foreign language, having parents originating from other countries, or contact to other cultures through food, music or friends. Participants who score high on the MES were found to come up with less conventional (i.e. divergent) gift ideas.

Diversity aids divergent thinking through a non-categorical mindset.

Numerous findings thus show that prolonged experiences of diversity promote divergent thinking and creativity. While these studies are necessarily either correlational or semi-experimental they offer converging evidence to the laboratory studies described in the previous section. It seems plausible that prolonged experiences of diversity contain the

⁸ Identifying with different social groups was not restricted to ethnic or cultural groups in this study. However, for the purpose of this discussion it is assumed that the cognitive process through which categorical inconsistencies between different social identities are resolved are similar to processes through which biculturals integrate their social identities (also see Chapter 2)

very type of experiences that are induced in laboratory studies: Episodes in which different social categories are activated simultaneously and conflict with each other. As described above, processing such experiences seems to activate a mindset in which the ability to think flexibly about categories is enhanced which aids creative performance. Individuals with a lot of exposure to diversity might be more apt at creativity tasks because they are accustomed to switching to such a mindset.

This beneficial effect of experiences of diversity on divergent thinking was moderated by salient diversity in some studies. In some cases, participants who have frequently experienced diversity only showed superior creativity when social diversity was salient (Cheng et al., 2008; Saad et al., 2013). Also in other studies experiences of diversity had a persistent effect on creativity across situations, but the effect was amplified when diversity was made salient (Maddux et al., 2010; Maddux & Galinsky, 2009). While there seems to be a clear effect of experiences of diversity on flexible thinking and creativity it is possible that this effect might be strengthened by salient diversity. Cues for social diversity might therefore augment the effect of diversity on divergent thinking. This is again in accordance with the idea that diversity promotes divergent thinking by enabling a mindset that is associated with flexible categorical boundaries.

Such cognitive flexibility in dealing with categorical information would also explain why individuals who have extended experience with diversity, such as biculturals tend to display greater cognitive flexibility (i.e. ability to integrate information from different viewpoints; Benet-Martínez et al., 2006; Tadmor et al., 2009; Maddux, Bivolaru, Hafenbrack, Tadmor & Galinsky, 2014). Integrating information from different viewpoints can require making connections across different categorical domains (such as social identities; Tadmor et al., 2009). This task should be considerably easier when boundaries between categories are weak and relatively flexible.

5.1.3 When Non-Categorical Thinking Can Hurt Self-Regulation

Experiencing diversity thus seems to enable individuals to think in more creative and divergent ways, especially when diversity is made salient. However, a high degree of diversity experiences and salient diversity are the precise conditions under which self-regulatory performance was found to suffer in Studies 1-3. How can these findings be reconciled? As indicated above, current findings suggest that diversity strengthens creativity because it enables people to think more flexibly about cognitive categories. In other words, cognitive categories might be seen less as rigid rules that perception must adhere to, and more as fluid guidelines that can be combined and changed. This decreased reliance on categorical rules might lead to reduced rule monitoring which might affect self-regulatory performance. A weak reliance on categorical rules and structure, such as observed in individuals with low need for cognitive closure (NFCC), has sometimes been linked to poor performance on cognitive control tasks, especially when the task requires following clear and specific rules (Kossowska, Bukowski, & Czarnek, 2014; Kossowska, 2007a, 2007b). This has been explained as a trade-off for the increased cognitive flexibility, because cognitive flexibility might be disadvantageous when tasks require active monitoring of a specific goal despite distracting stimuli (Kossowska et al., 2014). In such situations, cognitive rigidity can lead to superior performance as it seems to enhance the attentional focus on goal-relevant attributes⁹.

Diversity might thus be linked to an increased flexibility towards cognitive categories, which allows for superior divergent thinking, creative performance and

⁹ However, cognitive rigidity and the simple filtering strategy associated with it seems to become ineffective when cognitive load is high (Kossowska, 2007a). Similarly, cognitive rigidity is detrimental when the task is more complex and requires integration of various sources of information (Bukowski, Sędek, Kossowska, & Trejtowicz, 2012; Bukowski, Von Hecker, & Kossowska, 2013).

cognitive complexity. This tendency seems further amplified when social diversity is made salient. This additional enhancement in flexibility towards categories seems to carry the drawback of temporarily decreased self-regulatory performance, as demonstrated in Chapter 4. This idea is supported by studies showing that cognitive flexibility can be accompanied by decreased attentional selectivity and a decreased monitoring of specific rules (Kossowska et al., 2014; Kossowska, 2007a, 2007b). In other words, diversity seems to benefit divergent thinking and creativity, because it promotes a flexible mindset towards cognitive categories as well as a relatively lax monitoring towards such cognitive processing rules. Amplifying this tendency when diversity is salient should decrease the attentional selectivity towards goal-relevant stimuli and make self-regulation less efficient (at least for simple tasks) as monitoring goal-relevant rules will be more difficult when perception is organised by relative fuzzy boundaries between categories. However, this style of processing might be adaptive when diversity is high, because it is likely to make inconsistency resolution easier as categorical conflicts should be less pronounced when boundaries between categories are less strict.

Such a form of adaptation to diversity would involve a low reliance on clearly defined categories and rules, and a recent study by Lu et al. (2017) suggests that this might indeed be a common response to diversity. Findings from this study revealed that experiences of diversity such as spending time abroad were linked to a relativistic moral stance and an increased willingness to commit immoral acts (Lu et al., 2017). This finding is in line with previous research showing that diversity improves divergent creativity (Godart et al., 2015; Hellmanzik, 2013; Leung & Chiu, 2010; Maddux & Galinsky, 2009), which relies on breaking free from domain-specific rules to create unusual (i.e. creative) mental associations and combinations (Bailin, 1987). Creative individuals tend to neglect rules not only during creativity tasks, but for other domains as well, as they generally feel

unconstrained by rules (Baucus, Norton, Baucus, & Human, 2008; Gino & Wiltermuth, 2014). Hence, diversity seems to promote a certain aspect of divergent thinking that involves a tendency to question and disregard conventional rules and norms. The need to rely on such rules for structure has also been found to be decreased in studies on diversity and need for cognitive closure. Individuals low in need for closure tend to have a low desire to impose structure to their perception through unambiguous schemas (e.g. Pierro & Kruglanski, 2008). Need for cognitive closure was found to be decreased after induced exposure to cultural diversity by recalling an episode in which the participant was exposed to a different culture (Tadmor, Hong, et al., 2012) or coming up with examples for counter-stereotypes (Vasiljevic & Crisp, 2013).

In the preceding sections I have reviewed how experiences of diversity promotes divergent thinking and superior creative performance, especially when diversity is made salient. I have also argued how this improved creative potential is mostly caused by an increased cognitive flexibility when it comes to managing cognitive categories. This elevated cognitive flexibility, however, can have the drawback of impaired self-regulation, at least when it comes to maintaining focus on specific goals and simple tasks. In a more general sense, it can thus be said that experiencing diversity promotes a flexible stance towards categories and rules. Individuals who have experienced a lot of diversity will tend to have a low reliance on rules and categories and feel relatively unconstrained by them. In the following section, I will incorporate these ideas into the theoretical framework of the CPAG model.

5.1.4 A Revised Adaptation Process for the CPAG Model

The central assumption of the CPAG model is that individuals who are exposed to challenging diversity on a constant basis will eventually adapt to this experience by becoming more cognitively flexible, especially when it comes to handling inconsistencies

between cognitive categories (Crisp & Turner, 2011). Flexibility in managing categories should be especially useful when it comes to tasks requiring divergent creativity, because these tasks demand unconventional thinking that breaks categorical conventions and rules. As reviewed above, there are a multitude of studies showing the benefits of diversity for creative performance and the ability to incorporate competing viewpoints. There is thus clear evidence on the benefits of diversity for cognitive flexibility.

What is put into question, however, is the hypothesised mechanism through which superior cognitive flexibility is acquired. The CPAG model originally suggested that prolonged exposure to diversity leads to superior cognitive inhibition, making stereotype suppression less depleting. This should leave more cognitive resources for generative thought, and hence improving cognitive flexibility. These assumptions seem incompatible with the findings reported in Chapter 4: Participants who had experienced a lot of diversity reported weaker self-regulation and displayed inferior performance on the Stroop, at least when diversity was salient. Why does experiencing diversity promote improved cognitive flexibility, but also seems to be linked to poor cognitive control?

To understand how this pattern might occur, it is important to consider how the original hypothesis was derived. Adaptation to diversity ultimately has to improve the ability to resolve categorical inconsistencies, and empirical evidence suggests that this is achieved by superior divergent and flexible thinking. Studies on counter-stereotypes show that generative thought in inconsistency resolution requires inhibition of stereotypical content. Inconsistency resolution for most people seem to involve a) inhibiting the stereotypical content to then b) generate emergent attributes (Hutter & Crisp, 2006; Macrae et al., 1999). It was therefore assumed within the CPAG model that increased cognitive flexibility has to occur via improved cognitive inhibition. However, in Studies 1-3 participants' self-regulation was decreased in situations in which previous studies

found improved divergent thinking (high degree of diversity experiences and salient diversity). This suggests that individuals who have experienced a lot of diversity achieve superior divergent thinking without relying too much on cognitive inhibition. Their strategy of inconsistency resolution thus must differ from the default strategy that has been observed in previous studies on counter-stereotypes. Findings from Studies 1-3 suggest that participants with many experiences of diversity employ a strategy for resolving inconsistencies and generating emergent attributes that not only is independent of cognitive inhibition, but even might impair self-regulatory performance.

The available studies on the impact of diversity suggest that diversity promotes a mindset that enables thinking about categories in a flexible manner and allows for the integration of competing categorical information. Also, experiences of diversity seem to be accompanied by a generalised independence of cognitive rules and norms. This independence of clear rules and structure is expressed by studies showing that diversity leads to a low need for cognitive closure, as well as a relativistic moral stance.

This type of non-categorical thinking resulting from experiences of diversity is similar to the cognitive flexibility originally proposed by the CPAG model (Crisp & Turner, 2011), which describes a mode of thinking that is relatively unconstrained from automatic stereotypical associations. The CPAG model assumes that such cognitive flexibility involves inhibition of stereotypical information as well as generative thought. Cognitive flexibility is assumed to improve after repeatedly experiencing diversity mostly because the capacity for inhibitory control is increased. The modification of that model suggested here is that adaptation as a response to repeated experiences of diversity might not lead to improved inhibitory control, because improved inhibitory control is not required for more efficient inconsistency resolution. Instead it might rather lead to an increase in generative, divergent thought when diversity is made salient. This

improvement in divergent thought results from a decreased reliance on categorical information when diversity is salient for individuals who have frequently experienced diversity. A mode of thinking that is less dependent on categories with sharp boundaries should make it easier to resolve inconsistencies between these categories or failing that to accept and tolerate these inconsistencies. The result will thus be an enhanced ability to integrate and acknowledge potentially conflicting viewpoints (i.e. increased cognitive complexity). However, as attention to categorical rules is decreased, performance on cognitive control tasks might temporarily suffer as well. Thus, the self-regulatory performance of individuals with diversity experience might be weak when diversity is salient, not because they have less cognitive resources available, but rather because they engage in a mindset with motivational and attentional tendencies which are suboptimal for self-regulatory tasks.

It should be emphasized that this process of cognitive response would still lead to improved cognitive flexibility and would therefore still be compatible with previous findings suggesting enhanced flexibility after prolonged exposure to diversity. The suggested modification of the model also should not suggest that stereotype inhibition does not take cognitive effort or is not an act of self-regulation. Rather, it is suggested that individuals who frequently experience diversity acquire a mindset for certain situations that helps them to weaken the activation of the social categories in the first place, making stereotype inhibition less of an issue.

The CPAG model can therefore be modified to incorporate the findings from Chapter 4 in the following way: Prolonged exposure to challenging diversity does lead to improved cognitive flexibility. This improvement occurs, because experiencing diversity leads to the acquisition of a mindset for the resolution of categorical inconsistencies. This mindset involves a relatively flexible stance on cognitive rules and norms, with only weak

and blurry distinctions between cognitive categories. Under this mindset, reliance on categories is low, but so is the active monitoring of specific goals and rules. This mindset will usually be activated when diversity is salient to aid the resolution of potential categorical inconsistencies.

If this revised model is accurate, people who frequently experienced diversity should display a low reliance on rules. If this generalises to social norms as well, individuals with many experiences of diversity should also tend to resist pressure to conform conventional norms and tend to act independent of societal rules, especially when diversity is made salient. This prediction was tested in three studies which are reported in the following chapter.

CHAPTER 6: DIVERSITY, RULE INDEPENDENCE AND CONVENTIONAL VALUES

Experiencing diversity is likely to challenge stereotypes and therefore requires the resolution of stereotypical inconsistencies. Resolving such inconsistencies requires generative and unconventional thinking. Frequently experiencing diversity might therefore lead to a tendency towards unconventional thinking, at least when diversity is salient. In this chapter, I present studies to test the hypothesis diversity leads to unconventional thinking, a decreased reliance on rules and decreased conformity to conventional values. Findings from Study 4 demonstrated that exposure to diversity leads people to prioritise autonomy over conformity when diversity is salient. In Study 5 it was found that diversity makes positive contact more likely which in turn decreases people's reliance on rules and conventional values. Study 6 also showed a decreased reliance on rules and traditions for participants who reported very intense episodes of positive contact. In addition, participants with frequent positive contact were less willing to submit to authority. The Implications of these results for the understanding of the impact of diversity on values and norms as well as potential underlying mechanisms are discussed.

The findings reported in Chapter 4 indicate that prolonged experiences of diversity are linked to impaired self-regulation, at least when diversity was made salient. As discussed in Chapter 5, it seems plausible that these findings represent the activation of a mindset with a low reliance on cognitive rules and categories. This decreased attention towards cognitive rules and scripts should help in resolving categorical conflicts, but might also come at the expense of a more lenient monitoring of conflicts with behavioural rules. In other words, individuals with many experiences of diversity might,

under certain conditions, lean towards abandoning categorical thinking in favour of more unconventional and divergent thinking.

The idea that experiencing diversity is linked to unconventional thinking is supported by a multitude of studies (Cheng & Leung, 2013; Cheng et al., 2011, 2008; Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Godart et al., 2015; Hellmanzik, 2013; Leung & Chiu, 2010; Maddux et al., 2010; Maddux & Galinsky, 2009; Saad et al., 2013; also see Chapter 5). Divergent thinking seems to be linked to a generalised low reliance on rules, as demonstrated by the finding that participants with a lot of exposure to diversity are more likely to neglect absolute moral rules (Lu et al., 2017). Furthermore, experiences of diversity have also been linked to a low need for cognitive closure, indicating a low reliance on rules when making sense of one's environment (Maddux et al. 2014; Vasiljevic & Crisp, 2013).

A low reliance on rules and structure is not uncommon for individuals who excel in creative tasks. Divergent thinking requires the ability to break free from domain-specific rules to create of unusual (i.e. creative) mental associations and combinations. This ability has been linked to a general tendency of creative individuals to feel unconstrained by rules (Bailin, 1987; Baucus et al., 2008; Gino & Wiltermuth, 2014). Consistent with this idea, groups displayed more creativity in discussions when members were low in Need for Closure (Chirumbolo, Livi, Mannetti, Pierro, & Kruglanski, 2004).

There is thus strong evidence to suggest that experiencing diversity in an ethnically diverse environment might lead to the development of a mindset favouring unconventional, divergent thinking that is relatively unconstrained by categorical rules and norms. Therefore, individuals might also feel less inclined to follow confirmatory pressure or conventional values.

In the following, I will present three studies that explore the influence of diversity on the reliance on rules and conventional norms for majority members. Following up on the findings from Chapter 4, these studies also serve to investigate if any effects of diversity are moderated by salient diversity.

6.1 Study 4: Diversity and Social Conformity Values

This study investigated if individuals who have frequently experienced diversity feel a lower desire for conformity when expecting diversity-related information (i.e. when diversity is salient). Such a change in norm perception might have partly been responsible for the down-regulation of self-control observed when diversity was made salient in Studies 1-3. In this study, participants' norms regarding their desire for conformity were measured by the Social Conformity/Autonomy Scale (SCA; Feldman, 2003). This scale indicates the preference for norms that ensure social cohesion versus norms that emphasize social autonomy. In addition, this study examined the role of current experiences of diversity.

6.1.1 Method

Participants. For this study, 177 White British participants were recruited at the University of Sheffield. Students of all faculties were invited via email to participate in an online study on "beliefs and experiences of English Students". In exchange for participation, students entered a prize draw for vouchers for several British shops. To participate, the student's hometown had to be located in England, and the students had to access the survey from a non-mobile device. Ethnic membership was not indicated as a criterion as this might have made group membership overly salient which could have influenced the results. Instead, members of ethnic minorities (non-White British participants) were filtered out after data collection. Participants were randomly assigned to one of two conditions (diversity salience or control). In the diversity salience condition,

participants were reminded of their experiences of diversity before they answered questions on social conformity values, their ability to delay gratification and general impulsivity. The participants (132 female, 45 male) were aged between 18 and 63 years ($M = 23.69$, $SD = 7.74$). One participant had missing data (i.e. did not answer all questions), leaving 176 participants with data for all variables.

Procedure and materials. As in the previous two studies, participants received demographic questions and questions on their exposure to diversity. In addition, participants completed the questions on their positive interethnic contact used in Study 3. Measures for participant's experience of diversity thus included their previous exposure to diversity as well as their early and current positive contact¹⁰. Participants also completed the ADOG and BIS-Brief from Study 1 and 2, as well as the Social Conformity/Autonomy Scale (SCA; Feldman, 2003).

Social Conformity/Autonomy Scale (SCA). This scale measures the relative priority given to social conformity versus personal autonomy values (Feldman, 2003; see Appendix L for the full scale). Social conformity in the context of this scale is understood to ensure social cohesion and order through common behavioural norms. Such common norms, however, threaten values of personal freedom, because they place rules and restrictions on the individual. The SCA indicates how much participants value personal autonomy when it conflicts with their desire for social conformity. Participants who score high on the SCA have a strong preference for personal autonomy and an aversion to strict social norms. A low score on the SCA, on the other hand, indicates a strong desire for social conformity and adherence to a particular (i.e. non-diverse) set of norms.

¹⁰ This study was designed and conducted before study 3 (reported in Chapter 4) but is described here because it fits better conceptually with the other studies in this chapter. For this reason, we did not measure participant's current exposure to diversity.

The items in this scale force a choice between two statements (for example: “I believe that: A. It is most important to give people all the freedom they need to express themselves. Or B. Our society will break down if we allow people to do or say anything they want.”), and are scored on a 4-point scale: 1 – *strongly agree with A*, 2 – *agree with A*, 3 – *agree with B*, and 4 – *strongly agree with B*. The measure showed good internal consistency for this sample (Cronbach's $\alpha = .84$).

Conditions. As in Study 2 and 3, the order in which the materials were presented to participants depended on the condition.

Diversity salience condition. After receiving demographic questions, participants answered questions about their exposure to diversity and positive interethnic contact. This served as a prime for their diversity experiences. Subsequently participants completed the ADOG, BIS-Brief and SCA (order of these scales was counter-balanced).

Control condition. In the control condition, participants received the ADOG, BIS-Brief, and SCA (again the order was counter-balanced) before answering the questions on their experiences of diversity.

6.1.2 Results

As in in the previous studies, I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were very small for all geographic levels (district, county and region; $DEs < 1.06$). Therefore, a multilevel analysis was deemed unnecessary. All statistical tests were carried out with a level of significance of $\alpha = .05$. All results were controlled for gender, age, subjective SES and communal SES.

Outlier exclusion and data inspection. Participants that took an unusually long time to complete the questionnaire were excluded. This was done to ensure that participants paid sufficient attention to the questions and that the manipulation of diversity salience would be effective. The median time in minutes for completing the

study was $Mdn = 10$. Using the same criteria as in previous studies (see Chapter 4) all participants taking longer than 29 minutes were omitted from analysis. This led to the exclusion of 10 participants with 167 remaining participants (166 provided data for all variables).¹¹

As in previous studies, diversity had a non-normal, positively skewed distribution. Again, the distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for diversity.

Self-regulation. To examine the effect of salient diversity and early experiences of diversity on self-regulation, a multivariate General Linear Model (GLM) was fitted to the data. ADOG and BIS scores were entered to the GLM as dependent variables. Condition, early exposure to diversity, early positive contact and current positive contact were treated as predictors.

No significant effects on self-regulation emerged from the analysis, *Willk's* $\Lambda > 0.97$, $F_s < 2.13$, $p_s > .12$. The findings from previous studies were thus not replicated.

Social Conformity/Autonomy. The impact of salient diversity and experiences of diversity on social conformity values was also examined. A univariate GLM was fitted with SCA as dependent variable and condition, early exposure to diversity, early positive contact, and current positive contact as predictors.

Early positive contact predicted preference for autonomy over conformity across conditions, $F(1, 154) = 8.71$, $p = .004$, *partial* $\eta^2 = .05$, $\beta = .51$. Furthermore, early

¹¹ The analysis led to similar conclusions when outliers were included with no significant effects on self-regulation, *Willk's* $\Lambda > 0.97$, $F_s < 1.92$, $p_s > .15$, a significant effect of positive contact on SCA, $F(1, 164) = 5.38$, $p = .02$, *partial* $\eta^2 = .03$, and a significant positive contact*condition interaction effect, $F(1, 164) = 5.04$, $p = .03$, *partial* $\eta^2 = .03$.

positive contact formed a significant interaction with condition, $F(1, 154) = 4.01, p = .047$, $partial \eta^2 = .03$. A moderation analysis in PROCESS revealed that positive contact had no impact in the control condition, $standardised\ effect = .09, t(154) = .62, p = .53, 95\% CI [.25, .78]$. When diversity was salient, however, more frequent early positive contact predicted a stronger preference for autonomy over conformity values, $standardised\ effect = .52, t(154) = 3.67, p < .001, 95\% CI [-.20, .37]$. This moderation effect can also be seen in Figure 5.

No other main or interaction effects reached significance, $F_s < .86, p_s > .35$. There was thus no effect of early exposure to diversity or current positive contact.

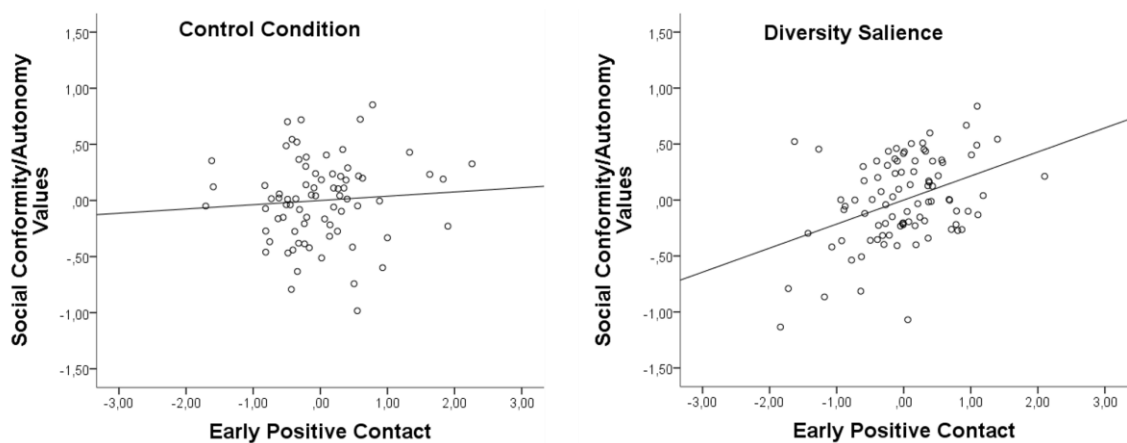


Figure 5. Partial regression plots of early positive contact and Social Conformity/Autonomy (SCA) scores with fitted regression lines, displayed per condition. Higher scores on SCA indicate a preference of autonomy over social conformity. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal socioeconomic status), early exposure to diversity and current positive contact.

Mediation analysis. Even though exposure to diversity had no effect on SCA in the previous analysis it is still important to test the hypothesis that effects of early exposure to diversity are mediated by positive contact. Diversity is a complex factor with

many potentially contradicting aspects. Indirect effects of exposure to diversity on SCA through positive contact might have been masked by other opposing factors contained within diversity exposure, such as an aggravating effect on negative contact, which in turn might have antagonizing effects on SCA. I therefore conducted a mediation analysis in PROCESS. As shown in Figure 6, the relationship between exposure to diversity and SCA was indeed mediated by positive contact. The standardised regression coefficient for the indirect effect was *standardised ab* = .19, 95% CI [.08, .32], meaning that a higher level of exposure to diversity lead to a stronger preference for autonomy via positive contact.

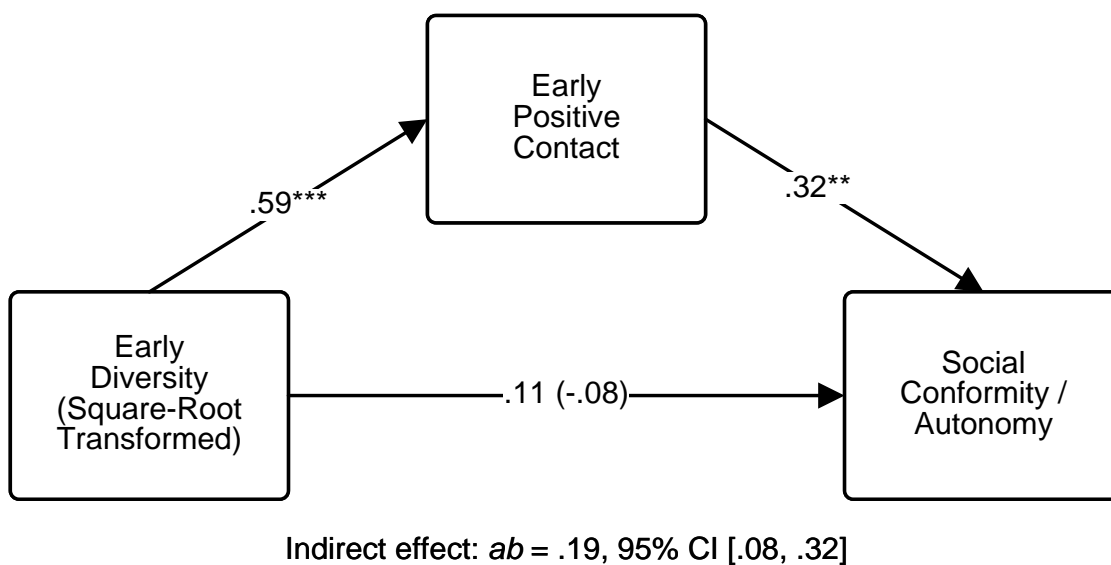


Figure 6. Relationship between exposure to diversity and Social Conformity/Autonomy (SCA) as mediated by positive contact. Coefficients are standardised. The regression coefficient between early diversity and SCA, controlling for early positive contact, is given in parenthesis. Higher scores on SCA indicate a preference of autonomy over social conformity. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

It was also tested if these mediations were moderated by condition. For the mediated effect of diversity via positive contact the index for moderated mediation was significant (*standardised index* = .25, 95% *CI* [.01, .52]). As displayed in Figure 7, the indirect effect on autonomy values was present in the diversity salience condition, *standardised ab* = .30, 95% *CI* [.12, .52]. There was no effect in the control condition, *ab* = .05, 95% *CI* [-.11, .21].

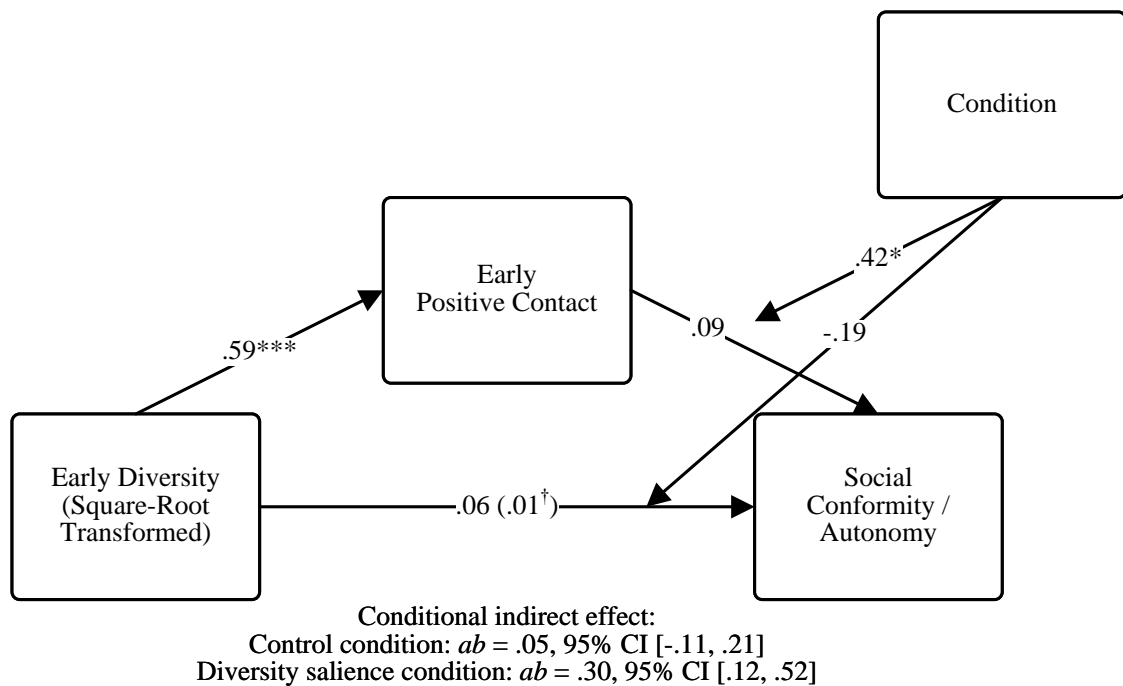


Figure 7. Relationship between exposure to diversity and Social Conformity/Autonomy (SCA) as mediated by positive contact and moderated by condition. Coefficients are standardised, except for interaction effects for condition. The regression coefficient between early diversity and SCA, controlling for early positive contact, is given in parenthesis. Higher scores on SCA indicate a preference of autonomy over social conformity. $^{\dagger}p < .10$ $^{*}p < .05$. $^{***}p < .001$

Power analysis. The ability of this study to detect an interaction effect of diversity salience and diversity experiences on social conformity values was evaluated by a power analysis. The population effect size was estimated to be close to the interaction effects regarding cognitive inhibition found in Study 2 and 3, $\eta^2 = .05$. The power of this study for this population effect size was $power = .84$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .046$ at $power = .80$.

Since validating the interaction effect of diversity salience and diversity experiences on measures of cognitive inhibition was also a main goal of this study, I conducted a second power analysis. This power analysis evaluated the ability of this study to detect such a multivariate interaction effect. The population effect size was estimated to be $\eta^2 = .05$. The power of this study for this population effect size was $power = .75$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .056$ at $power = .80$.

Correlation between self-Regulation and Social Conformity/Autonomy Values. Unlike findings in earlier studies, diversity did not have any effect on self-regulation. It was therefore not possible to test directly if the effect found in Studies 1-3 might have been mediated by a change in autonomy values. However, it was still possible to assess the correlation between self-regulation measures and SCA to see if a change in autonomy values might theoretically have influenced self-regulation in previous studies. Social conformity values were indeed associated with both reports of low delay gratification, $r(165) = -.23, p = .002$, as well as with reports of high general impulsivity, $r(165) = .21, p = .007$.

6.1.3 Discussion

Findings indicated that diversity had an indirect effect on conformity/autonomy values via positive contact, leading to a preference for autonomy. However, this pattern

was only present when participants were reminded of their experiences of diversity. These findings are parallel to the effects of diversity on self-regulation in Study 2 and 3.

In contrast to earlier studies, however, experiences of diversity had no effect on measures of self-regulation. Why previous findings could not be replicated is not clear, since the methodology of this study is very close to the previous studies, especially to Study 2. Still, the effect might have been weakened in this study, because the order of some questionnaires was counter-balanced. Study 2 did not use counter-balancing, and also contained less material. However, strong autonomy values were associated with strong impulsiveness and weak delay gratification. These findings indirectly support the idea that the effects of diversity on self-regulation might be at least partially explained by an increase in autonomy values.

While *early* positive contact did predict preference for social autonomy when diversity was salient, *current* positive contact had no effect. This might indicate that diversity needs to be experienced for an extended period to influence fundamental value systems. Participants who report high levels of positive interethnic contact until they turned 18 are likely to have made such experiences for extended periods of time while they grew up. Positive interethnic contact in the past six months, however, is more likely to tap into experiences that are not necessarily experienced on a regular basis for a longer time. Furthermore, experiences of diversity that are made before the age of 18 might also have a stronger effect because they fall into a developmental period that is crucial for forming basic value systems. Fundamental value systems tend to be relatively stable over adult life, and stability of attitudes increases with age (Alwin & Krosnick, 1991; Sears & Funk, 1999).

Findings from this study indicate that individuals who have experienced a lot of diversity might depend less on social norms when diversity is made salient. In this study,

values concerning social conformity and autonomy were affected by diversity and positive contact. However, it is possible that this decreased reliance on norms leads to a change in processing tendencies as well. In other words, participants might rely less on rules *in general*. Furthermore, Study 4 demonstrated that diversity is associated with more positive contact, which then in turn promotes values that emphasize autonomy over conforming to conventional norms. However, diversity might be related not only to positive contact but to negative contact as well for majority members (Koopmans & Veit, 2014). Negative contact has been shown to promote more conventional values as measured by scales such as Right-Wing Authoritarianism (RWA; Dhont & Van Hiel, 2009). In other words, diversity might be linked to episodes of both positive and negative contact which in turn have opposing effects on the tendency to subscribe to conventional norms and rules. These possibilities were further investigated in Study 5.

6.2 Study 5: Diversity, Rule Dependence and Conventional Values I

This study investigated the effects of positive and negative interethnic contact on the reliance on conventional values as well as on rules in general. It was also examined whether any effects of positive or negative contact on norm perception or rule dependence were moderated by salient diversity.

The Right-Wing Authoritarianism–conventionalism scale was used as an alternative measure for conventional values. For this study, structural equation modelling (SEM) was employed to separate effects of diversity on values and rule-dependence. Additionally, this study also evaluated the effects of positive and negative contact. This allowed me to test a model in which diversity leads to more positive and negative contact which in turn affect rule independence and adherence to conventional norms. Two separate models were fitted for early and current diversity. This way it could be

investigated if past and current experiences of diversity had a similar impact on the dependent variables (also see Figure 9 below for a diagram of the models tested).

6.2.1 Method

Participants. For this study, 217 White British participants were recruited via prolificacademic.co.uk, an online platform for conducting academic studies. Participants were randomly assigned to one of two conditions (diversity salience or control). In the diversity salience condition, participants were reminded of their experiences of diversity before they answered questions on rule independence, right-wing authoritarianism (RWA) and system justification. To participate, the student's hometown had to be located in England, and participants had to access the survey from a non-mobile device. The participants (110 females, 106 males, 1 other) were aged between 17 and 59 years ($M = 25.82$, $SD = 8.59$). Some participants had missing data. 209 participants provided data for all variables.

Procedure and materials. As in the previous two studies, participants received demographic questions (identical to previous studies) and questions on their experiences of diversity. They also completed a set of questions on rule-dependence and RWA-conventionalism.

Experiences of diversity. Participants' early exposure to diversity was again assessed via a composite measure of their objective and subjective exposure to diversity in their home district. The material for these measures was identical to Study 4. To gain a more complete picture, participants' positive as well as negative interethnic contact while growing up was measured. Additionally, participants' current objective exposure to diversity was measured as well as their current level of positive and negative interethnic contact.

Interethnic contact. Participants received questions on their positive and negative interethnic contact. The scale for positive contact contained the same two questions from Study 3 and 4 but one additional question to measure negative contact was included as well¹² (“How often did somebody pester you that was from an ethnic background different from your own?”). The questions were scored on a Likert scale from 1 (*never*) to 5 (*very often*). Participants were asked about their interethnic contact while growing up as well as their current level of contact in the past 6 months (see Appendix M for the full scale).

Current objective exposure to diversity. For participants who were currently living in England ($n = 181$), current objective exposure to diversity was assessed in the same manner as diversity for their home district. This was based on their reported place of residence.

Rule independence. To assess how far participants felt unconstrained by rules, participants were presented with a set of three pictures (taken from Gino & Wiltermuth, 2014), each of which displayed people deviating the norms in some form (displayed in Figure 8). Participants responded to the question "If you were in the situation depicted in the picture, to what extent would you care about following the rules?" on a 7-point scale (1 = *not at all*, 7 = *very much*). The full scale can be found in Appendix N. The measure showed acceptable internal consistency in this study (*Cronbach's* $\alpha = .67$).

¹² The scale originally contained additional questions for positive and negative contact concerning the emotional content of interethnic encounters, for example: 'Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions? - Angry'. However, preliminary factor analysis revealed that these items load on a different factor, representing the quality of interethnic contact. These items were therefore dropped from analysis. A refined scale measuring both quantity and quality of contact was used in Study 6.

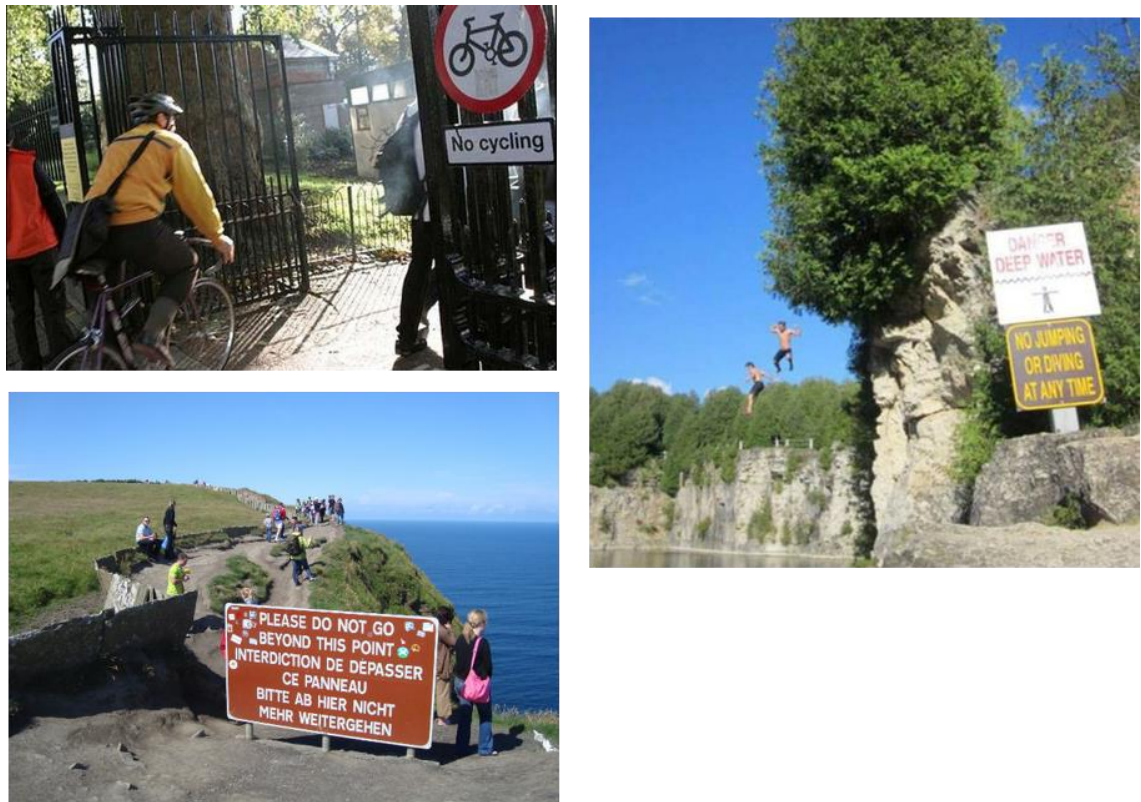


Figure 8. Images used in Study 5 to assess in how far participants felt unconstrained by social rules.

Right-Wing Authoritarianism-conventionalism (RWA-conventionalism). Three items from the RWA scale (Altemeyer, 1996) were used to assess participants' right-wing authoritarianism. These items were selected to represent the conventionalism facet of RWA (based on Mavor, Louis, & Sibley, 2010). Individuals high in RWA-conventionalism believe that members in society should be required to follow traditions and social norms (Altemeyer, 2007). This scale is thus conceptually similar to the SCA scale employed in Study 4. Items contained questions such as "Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else." (reversed item), and were rated on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The full scale is reported in Appendix O. This scale demonstrated acceptable internal consistency in this study (*Cronbach's* $\alpha = .79$).

Conditions. As in Study 2 and 3, the order in which these materials were presented to participants depended on the condition.

Diversity salience condition. After receiving demographic questions, participants answered questions about their exposure to diversity and interethnic contact. This served as a prime for their diversity experiences. Subsequently participants completed questions on rule independence, right-wing authoritarianism and system justification.

Control condition. In the control condition, participants received questions on rule independence, right-wing authoritarianism and system justification before the questions on their experiences of diversity.

6.2.2 Results

I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were very small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.26$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of $\alpha = .05$. All models reported below were controlled for gender, age, subjective SES and communal SES for home district and current district. All reported path coefficients are standardised.

Outlier exclusion and data inspection. Participants that took an unusually long time to complete the questionnaire were excluded from analysis. The median time in minutes for completing the study was $Mdn = 7$. Using the same criteria as in previous studies all participants taking longer than 21 minutes to complete the study were omitted

from analysis. This led to the exclusion of one participant with 216 remaining participants (208 provided data for all variables).¹³

Home district diversity as well as the separate scores for past subjective diversity had a non-normal, positively skewed distribution. The distribution of home district diversity could be improved by performing a logarithmic transformation on the data. The distribution of the indices for subjective diversity could be improved by performing a square root transformation on the data. The following analysis was carried out with the logarithmic transformed data for home district diversity and the square root transformed data for subjective diversity scores.

Correlations. The estimated intercorrelations between the different latent and observed factors, including control variables, are displayed in Table 9.

Structural equation models. As discussed above, the main goal of this study was to test the plausibility of a model in which diversity leads to more positive and negative contact which in turn affect rule independence and adherence to conventional norms. Such a model was fitted separately for early and current experiences of diversity (see below for a combined model which models both early and current diversity). The hypothesized models were tested by applying path analysis in Mplus 7. The two main models tested in this study are shown in Figure 9.

¹³ The inclusion of this one outlier in the SEM-Analysis lead to identical conclusion with almost identical fit indices for the tested models and only very minimal differences for the reported path coefficients.

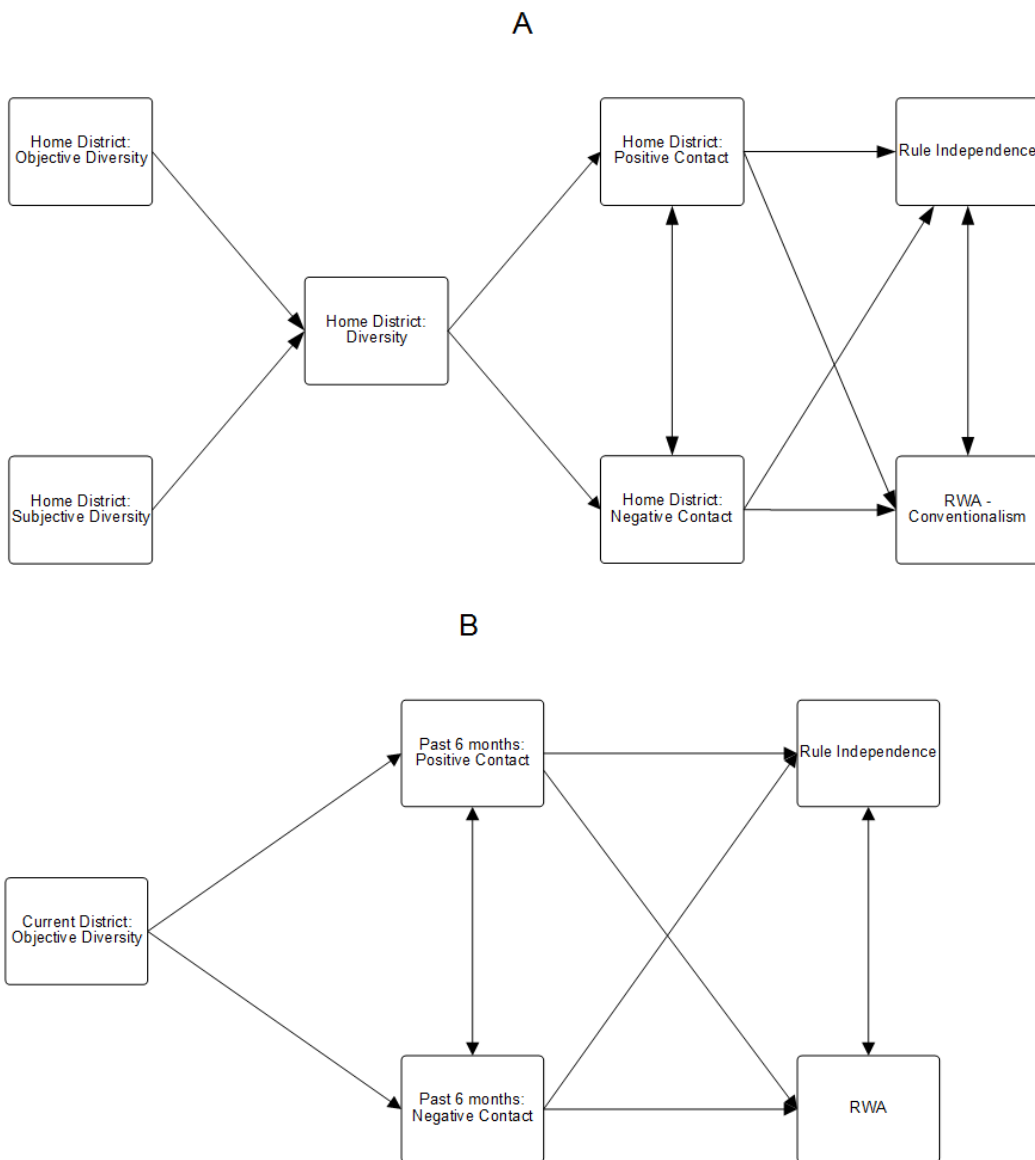


Figure 9. Main models tested in Study 5.

Table 9

Correlation Coefficients for Latent and Observed Variables in Study 5.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Home District: Diversity ^a	-											
2. Home District: Positive Contact ^a	.66 ^{***}	-										
3. Home District: Negative Contact ^a	.44 ^{***}	.30 ^{***}	-									
4. Current District: Objective Diversity ^b	.54 ^{***}	.33 ^{***}	.19 [*]	-								
5. Past 6 Months: Positive Contact ^a	-.14	.21 [*]	-.01	.24 ^{**}	-							
6. Past 6 Months: Negative Contact ^a	-.04	-.11	.37 ^{***}	.05	.18 [*]	-						
7. Rule Independence ^a	.30 ^{**}	.37 ^{**}	.05	.19 [†]	.19 [†]	.05	-					
8. RWA-Conventionalism ^a	.00	-.19 [*]	.07	.22 [*]	.27 ^{**}	.12	.02	-				
9. Age ^b	-.12	-.39 ^{***}	-.23 ^{**}	-.22 ^{**}	-.21 ^{**}	-.08	-.41 ^{***}	.12	-			
10. Gender ^{b c}	.14	.11	.14 [†]	.18 [*]	.02	.09	.36 ^{***}	.12	-.26 ^{***}	-		
11. Subjective SES ^b	-.11	.02	-.11	.01	.21 ^{**}	.03	.15	-.11	-.12	-.13 [†]	-	
12. Home District: Communal SES ^b	.31 ^{***}	.15 [†]	.09	-.03	-.07	-.04	.01	-.04	.05	.07	-.16 [*]	-
13. Current District: Communal SES ^b	.15	.30 ^{***}	.13	.52 ^{***}	.14	-.05	.00	.26 ^{**}	-.15 [*]	.09	-.17 [*]	.21 ^{**}

Note: ^aLatent variable, ^bObserved variable

^cGender was coded 0 for female and 1 for male.

I first tested a model with diversity in one's home district predicting positive and negative contact which in turn predict rule-dependence and RWA (Figure 9A). The model showed an acceptable fit, $RMSEA = .06$, $CFI = .92$. The results for the modelled paths are shown in Figure 10. A high amount of positive contact predicted both lower levels of RWA-conventionalism, $\beta = -.22$, $p = .03$ as well as stronger tendency to disregard rules, $\beta = .31$, $p = .01$. Negative contact, on the other hand, predicted neither RWA-conventionalism nor rule independence, $ps > .13$. Rule independence and RWA-conventionalism were unrelated in this model, underscoring that these were distinct latent factors, $\beta = .02$, $p = .89$.

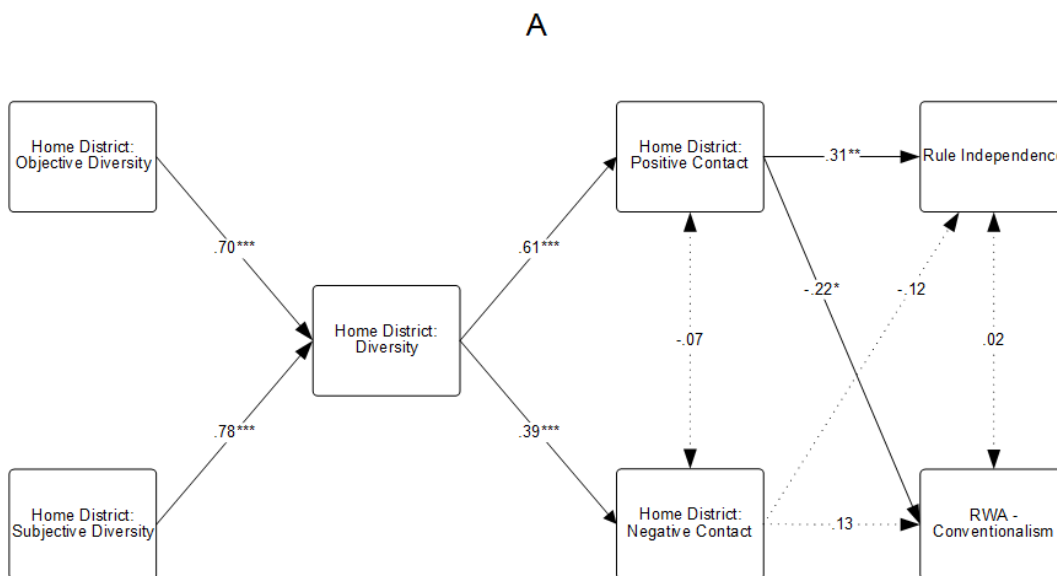


Figure 10. Results for model A in Study 5. Path coefficients are standardised. The model is controlled for gender, age, subjective socioeconomic status, communal socioeconomic status and minority membership (not displayed for simplicity). Solid lines highlight significant paths, while dotted lines highlight non-significant paths. * $p < .05$.

** $p < .01$. *** $p < .001$

It was also tested whether salient diversity moderated the paths to the dependent variables. However, none of the tests for moderation reached significance, $\chi^2s \leq 2.04$, $ps > .15$.

A parallel model was also tested using current experiences of diversity rather than past experiences (Figure 9B). This model provided an excellent fit to the data, $RMSEA < .001$, $CFI = 1.00$. The model results are shown in Figure 11. Current positive contact predicted lower levels of RWA-conventionalism, $\beta = -.21$, $p = .02$. However, it did not significantly predict rule independence, $\beta = .09$, $p = .37$. Negative contact also predicted RWA-conventionalism, $\beta = .25$, $p = .005$. Objective exposure to diversity did predict positive contact, $\beta = .25$, $p = .002$, but not negative contact, $\beta = .05$, $p = .55$. Participants who experienced frequent positive contact were also more likely to experience more frequent negative contact as well, $\beta = .20$, $p = .02$.

It was also tested whether the salience of diversity moderated the paths to the dependent variables. A trend indicated moderation of the path from positive contact leading to rule independence, $\chi^2(1) = 3.3$, $p = .07$: While positive contact in the control condition predicted more independence from rules, $\beta = .23$, $p = .08$, the relationship reversed when diversity was salient, $\beta = -.11$, $p = .40$. This trend runs counter to the expected pattern, but it is possible that adding questions on negative contact has effectively changed the experimental manipulation. The additional questions might have reminded participants primarily of negative experiences of diversity, either reversing or neutralizing the effect found in previous studies which had used questions with a neutral or positive framing. No other test for moderation reached significance, $\chi^2s \leq 1.8$, $ps > .19$.

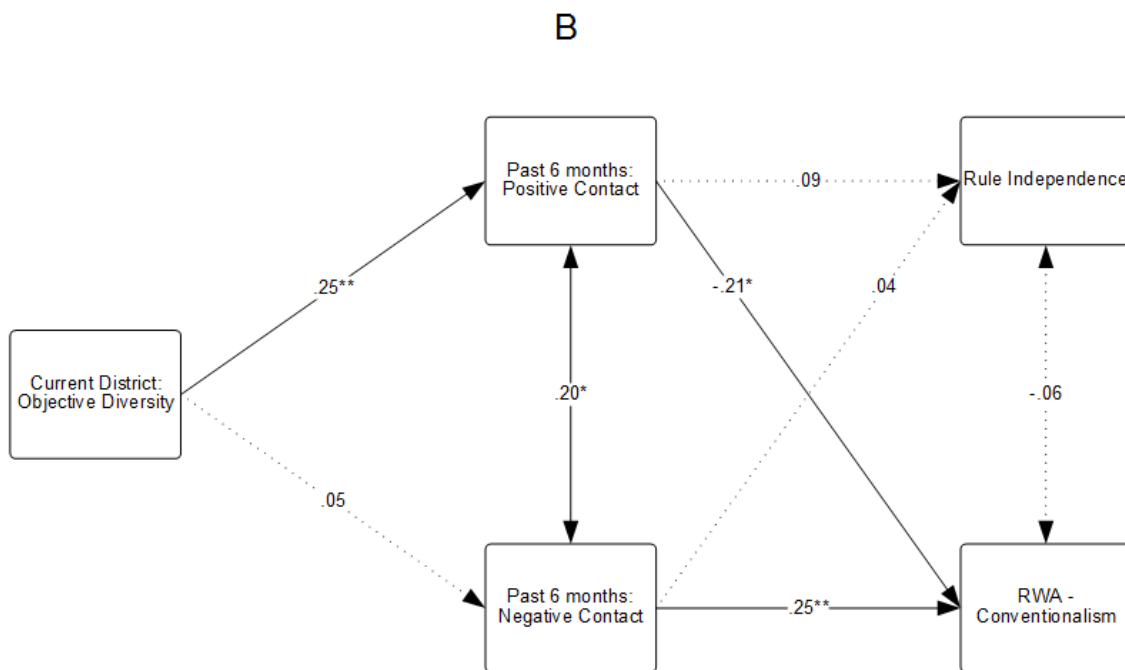


Figure 11. Results for model B in Study 5. Path coefficients are standardised. The model is controlled for gender, age, subjective socioeconomic status, communal socioeconomic status and minority membership (not displayed for simplicity). Solid lines highlight significant paths, while dotted lines highlight non-significant paths. * $p < .05$. ** $p < .01$. *** $p < .001$

A further model that was tested was a combined model, containing both past and current experiences of diversity (Figure 12), but the model provided a poor fit for the data, as indicated by the fit indices, $RMSEA = .09$, $CFI = .82$. The model results are still shown in Figure 13 for the sake of completeness, but parameters of this model should be interpreted with caution due to the bad fit.

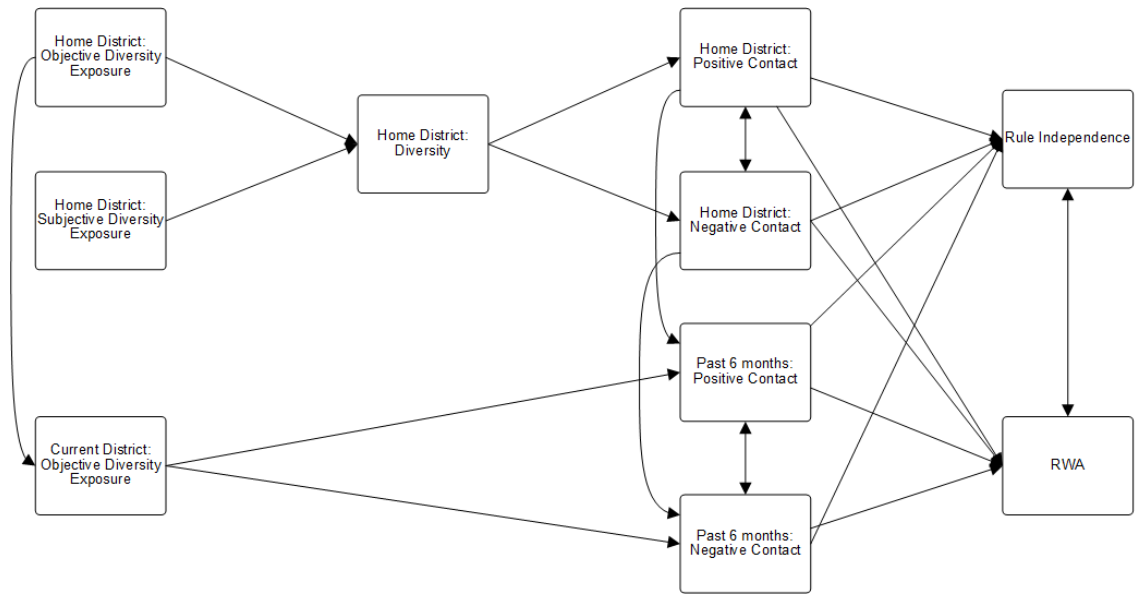


Figure 12. Diagram for the combined model tested in Study 5.

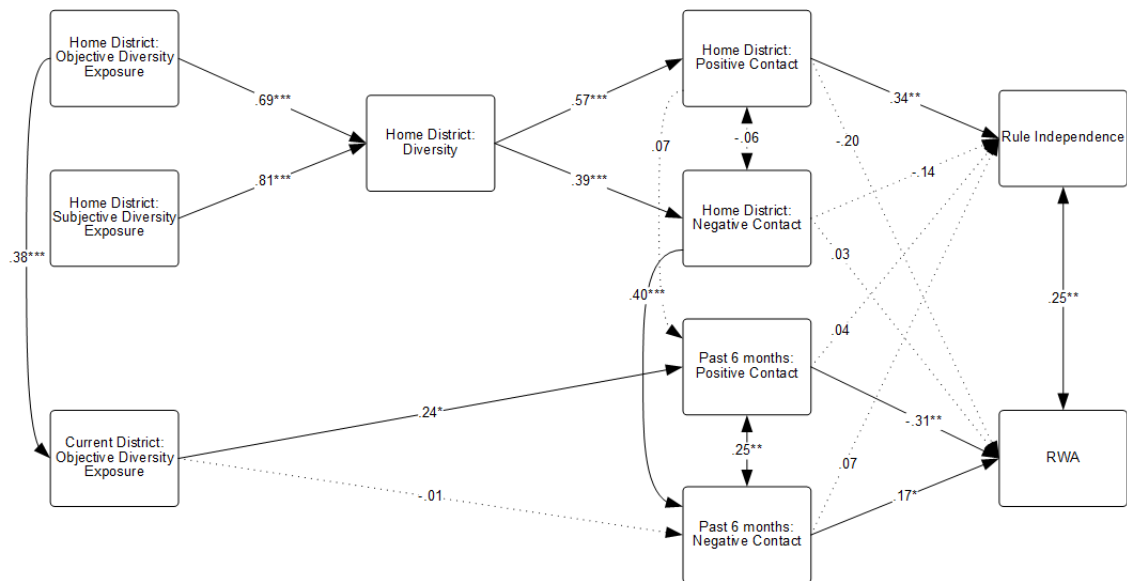


Figure 13. Results for the combined model in Study 5. Path coefficients are standardised. The model is controlled for gender, age, subjective socioeconomic status, communal socioeconomic status and minority membership (not displayed for simplicity). Solid lines highlight significant paths, while dotted lines highlight non-significant paths.

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

6.2.3 Discussion

Study 5 showed that diversity makes positive contact more likely, which in turn promotes rule independence as well as unconventional beliefs and norms. These were separate effects, and rule independence and RWA-conventionalism beliefs were not correlated. However, the most stable effect was that of positive contact on RWA-conventionalism as it was evident both for past as well as for current contact. Effects of positive contact on rule independence was only present for past positive contact. For the effect of negative contact on RWA-conventionalism on the other hand, reliable effects were only observed for current negative contact, counteracting the effects of positive contact.

In contrast to Studies 2 and 3, salient diversity did not reliably moderate the effects of experienced diversity. A possible explanation is that questions on negative contact were added for this study to better understand the influence of different types of contact. However, this is likely to have affected the manipulation of diversity salience itself. The additional questions might have reminded participants primarily of negative experiences of diversity due to their greater emotional impact (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). This might have erased the effect found in previous studies, which had used questions with a neutral or positive framing. To address this problem a further study was conducted in which participants only reported on their positive diversity experiences, similar to previous studies.

6.3 Study 6: Diversity, Rule Dependence and Conventional Values II

This study was designed to determine whether effects of diversity on conventional values and rule independence would be modified by the salience of positive diversity experiences. This study also delved deeper into the effects of different aspects of positive contact. In the previous studies items measuring positive contact focussed on the

frequency of everyday contact. As a result, the effect of the quality of contact has been neglected. In this study quality of contact was measured in addition to the frequency of contact.

6.3.1 Method

Participants. For this study, 98 White British participants were recruited via prolificacademic.co.uk, but also through promoting the study at the University of Sheffield. Participants completed the study online and were then either awarded with monetary payment (prolificacademic.co.uk) or with a spot in a raffle for a High-Street Voucher (University of Sheffield). To participate, the participant's hometown had to be located in England. Also, participants had to be students, and had to access the survey from a non-mobile device. The participants (66 females, 31 males, 1 other) were aged between 18 and 55 years ($M = 27.54$, $SD = 9.82$). Some participants had missing data. 87 participants provided data for all variables.

Procedure and materials. Participants were randomly assigned to one of two conditions (diversity salience or control). In the diversity salience condition, participants were reminded of their diversity experiences before they continued with the RWA and rule independence scale.

As in the previous two studies, participants received demographic questions (identical to previous studies) and questions on their experiences of diversity. They also completed a set of questions on rule-independence (identical to Study 4) and RWA (conventionalism and submission facet).

Experiences of diversity. To measure the experienced diversity, participants received the same material as in Study 4. Additionally, participants received questions on their current subjective exposure to diversity. Participants also received additional questions on their interethnic positive contact to measure the quality of their contact.

Current subjective exposure to diversity. Participants estimated the distribution of the four major ethnic groups in the UK (White British, White other, Asian/Asian British, and Black/Black British) for members of their university. They also estimated the distribution of ethnic groups for people living in their current neighbourhood (see Appendix F for the full scale). From these estimates, an index for current subjective exposure to diversity was computed, using the same method as for subjective home district diversity (see Study 1).

Quality of interethnic contact. Frequency of interethnic positive contact was measured with the same two questions as in Study 4. However, three more questions were added, assessing the quality of positive contact. Participants were asked to indicate the frequency of positive emotions during interethnic contact: “Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions?”. Participants indicated the frequency for three positive emotions (“*satisfied*”, “*cheerful*”, “*enthusiastic*”) on a Likert-scale from 1 (*never*) to 5 (*very often*). The full scale can be seen in Appendix E. The scale showed excellent internal consistency for both past as well as current positive contact, *Cronbach's* $\alpha > .93$. The correlation between the different aspects of positive contact is shown in Table 10.

Table 10

Intercorrelations for Positive Contact Measures in Study 6.

Variable	1	2	3	4
1. Hometown: Positive Contact - Frequency	-			
2. Hometown: Positive Contact - Quality	.39***	-		
3. Past 6 Months: Positive Contact - Frequency	.29**	.39***	-	
4. Past 6 Months: Positive Contact - Quality	.23*	.58***	.74***	-

Note: Degrees of freedom for all significance tests was $df = 92$.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Right-Wing Authoritarianism (RWA). This study contained items measuring the conventionalism and submission facet of RWA. The conventionalism facet represents the conviction that people should be required to follow traditions and social norms. Items contained questions such as “Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else”. The submission facet of RWA represents the willingness to submit to the established authority. Items contained questions such as “Obedience and respect for authority are the most important virtues children should learn”. This study included a selection of four items for conventionalism and three for submission. Selection of this item was based on the factor analysis carried out by Mavor et al. (2010).¹⁴ The selected items are reported in Appendix P. Items were rated on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*).

¹⁴ The original RWA scale also contains items measuring the aggressiveness facet, indicating the predisposition to cause harm to deviants or outgroups and to believe that this aggression is sanctioned by established authorities (Altemeyer, 1996). However, no items measuring RWA-aggressiveness were included in this study, because no predictions were made regarding the effect of diversity on RWA-aggressiveness. Diversity was expected to lead to a tendency towards unconventional thinking and hence lead to lower levels of conventionalism and a decreased willingness to submit to authority to uphold conventional values. However, a tendency towards unconventional thinking should not affect aggressiveness towards deviants.

Conditions. As in previous studies, the order in which these materials were presented to participants depended on the condition.

Diversity salience condition. After receiving demographic questions, participants answered questions about their exposure to diversity and positive interethnic contact. This served as a prime for their diversity experiences. Subsequently participants completed questions on rule independence and right-wing authoritarianism.

Control condition. In the control condition, participants received questions on rule independence, and right-wing authoritarianism before questions on their experienced diversity.

6.3.2 Results

I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were very small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.18$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of $\alpha = .05$. All results reported below were controlled for gender, age, subjective SES and communal SES for home district and current district.

Outlier exclusion and data inspection. Participants that took an unusually long time to complete the questionnaire were excluded from analysis. The median time in minutes for completing the study was $Mdn = 11$. Using the same criteria as in previous studies all participants taking longer than 36 minutes to complete the study were omitted

from analysis. This led to the exclusion of 4 participants with 94 remaining participants (84 provided data for all variables).¹⁵

Past diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for past diversity. In contrast, current diversity showed a normal distribution.

Effect of home district diversity on rule independence and RWA. To determine the effect of diversity on rule independence and RWA, a GLM was fitted to the data. Dependent variables in the GLM were rule independence, RWA-conventionalism and RWA-submission. The diversity salience condition, diversity of participants' home district as well as frequency and quality of positive interethnic contact while growing up were entered as independent variables. The three Interaction-terms of condition with each of the other independent variables were also entered as independent variables. The same control variables were used as covariates as in the previous studies.

The dependent variables were significantly affected by the frequency of positive contact, *Willk's* $\Lambda = 0.87$, $F(3, 70) = 3.38$, $p = .02$, *partial* $\eta^2 = .13$, as well as by the quality of contact, *Willk's* $\Lambda = 0.80$, $F(3, 70) = 5.78$, $p = .001$, *partial* $\eta^2 = .20$. The multivariate effect of diversity was approaching significance, *Willk's* $\Lambda = 0.92$, $F(3, 70) = 2.35$, $p = .08$, *partial* $\eta^2 = .09$. There were no reliable main effect or interaction effects

¹⁵ When outliers were included for the analysis, findings are mostly similar to the analysis without outliers: Frequency of early positive contact still had a significant multivariate effect, *Willk's* $\Lambda = 0.88$, $F(3, 73) = 3.38$, $p = .02$, *partial* $\eta^2 = .12$, as did quality of early contact *Willk's* $\Lambda = 0.81$, $F(3, 73) = 5.62$, $p = .002$, *partial* $\eta^2 = .19$. The effect of early exposure to diversity, however, was no longer marginally significant, *Willk's* $\Lambda = 0.93$, $F(3, 70) = 1.93$, $p = .13$, *partial* $\eta^2 = .07$. There were still no other reliable effects on the dependent variables, $F_s < 0.84$ $p_s > .47$. For current diversity, findings with outliers differed in the sense that the multivariate effect of quality of current contact only approached significance, *Willk's* $\Lambda = 0.92$, $F(3, 81) = 2.33$, $p = .08$, *partial* $\eta^2 = .08$.

with condition, *Willk's* $\Lambda_s > 0.96$, $F_s < .82$, $ps > .49$. The effect of exposure to diversity or contact on the dependent variables was therefore not affected by condition. These multivariate main effects were further explored by separate univariate tests for the dependent variables. Univariate results were obtained by fitting separate univariate GLMs for rule independence, RWA-conventionalism and RWA-submission with the same predictors as for the multivariate analysis.

Rule independence. Quality of contact lead to more rule independence, $F(1, 72) = 5.20$, $p = .03$, *partial* $\eta^2 = .07$, $\beta = .41$ while the frequency of positive contact or the level of exposure to diversity had no reliable effect, $F_s < 0.23$, $ps > .63$.

RWA-conventionalism. Quality of contact also lead to less RWA-conventionalism, $F(1, 72) = 9.43$, $p = .003$, *partial* $\eta^2 = .12$, $\beta = -.53$. Frequency of contacts or the level of exposure to diversity had no effect on RWA-conventionalism, $F_s < 0.54$, $ps > .46$.

RWA-submission. More frequent positive contact predicted lower levels of submission, $F(1, 72) = 6.26$, $p = .02$, *partial* $\eta^2 = .08$, $\beta = -.29$. Higher levels of diversity predicted higher levels of RWA-submission, $F(1, 72) = 5.98$, $p = .02$, *partial* $\eta^2 = .08$, $\beta = .31$. Quality of contact, on the other hand, had no effect on submission.

Effect of current experiences of diversity on rule independence and RWA. A similar GLM was fitted for current diversity. This model used objective and subjective diversity of the current residence as well as frequency and quality of positive contact of the past 6 months as predictors. Quality of positive contact emerged as a significant multivariate predictor, *Willk's* $\Lambda = 0.89$, $F(3, 75) = 2.95$, $p = .04$, *partial* $\eta^2 = .11$. No other main effect or interaction effects with condition reached significance, *Willk's* $\Lambda_s > 0.92$, $F_s < 1.94$, $ps > .13$. The effect of diversity or contact on the dependent variables was therefore not affected by condition. Following up with separate univariate GLMs for

each dependent variable revealed that high-quality positive contact predicted lower levels of conventionalism, $F(1, 77) = 7.31, p = .01, \text{partial } \eta^2 = .09, \beta = -.35$.

Power analysis. The ability of this study to detect a multivariate interaction effect of salient diversity and diversity experiences on the dependent variables was evaluated by a power analysis. The population effect size was estimated to be $\eta^2 = .05$. The power of this study for this population effect size was only $\text{power} = .40$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .11$ at $\text{power} = .80$.

6.3.3 Discussion

A high frequency of positive contact in the past predicted a low willingness to submit to established authorities. Individuals who experienced a lot of high-quality positive contact on the other hand were more likely to feel less constrained by rules and to believe people should not have to follow conventional norms and traditions. These effects were generally unaffected by the salience of diversity so these results mirror findings from Study 5 in which positive interethnic contact was linked to less conventional values regardless of the salience of diversity. It is thus possible that past and current experiences of diversity lead to a lower reliance on rules and norms across different situations. Together these results support the idea that positive experiences of diversity are connected to a decreased reliance on rules and authority as well as an increased preference for unconventional beliefs and opinions.

6.4 General Discussion

Over three studies frequent positive contact lead to a decreased reliance on categorical rules. This manifested itself in a decreased preference for conformity (Study 4), and a decreased reliance on rules and conventional values (Study 5 & 6). Positive contact thus seemed to drive the major changes resulting from diversity. It should be noted

that these findings mirror the results from Study 3 (Chapter 4) in the sense that the key component of diversity driving cognitive change was positive contact. Together these findings suggest that positive contact is an important part of diversity in promoting cognitive change and that part of this change involves a low adherence to rules and social norms.

The reliance on rules and norms seems to be more strongly influenced by early episodes of positive contact than more recent ones. Early positive interethnic contact was consistently linked to a low reliance on rules and norms through all three studies. Recent positive contact was still predicting a low level of conventionalism in two studies (Study 5 and 6), but had no impact on general rule independence or on attitudes towards social conformity. This might indicate that positive experiences of diversity before adulthood are more fundamental to one's approach towards social rules than recent experiences.

The effects of positive contact on rule independence and norm perception were visible across conditions in Study 5 and 6, but in Study 4 they were only present when diversity was salient. The findings so far are thus inconclusive on whether frequent positive contact affects reliance on rules across situations or only when diversity was salient. At present, however, evidence seems to be more in favour of the idea that frequent positive contact leads to a decreased reliance of categorical rules in general, unaffected by the salience of diversity.¹⁶

These results indicate that a decreased reliance on rules across situations is part of the long-term cognitive response to repeated episodes of positive interethnic contact.

¹⁶ This conclusion is also supported by a meta-analysis of Studies 4-6. This meta-analysis is reported in Chapter 8, together with meta-analyses of other effects reported in this thesis. Generally, there was no evidence for a moderating effect of salient diversity. Frequent positive contact while growing up was overall associated with less conventionalism, $r = -.19, p < .001$.

Positive contact in turn seems to be a consequence of living in an interethnically diverse environment, since diversity was associated with more positive contact throughout all three studies presented in this chapter. However, results from Study 5 suggest that diversity is also related to more negative contact as well. Similar effects of diversity on positive and negative contact for majority members have been found before (Koopmans & Veit 2014). This signifies that diversity is a complex and multifaceted factor which can promote factors with opposing effects. This idea is also reflected in an inconsistent mediation pattern reported by Schmid et al. (2013). In this study, diversity showed a positive indirect effect on trust via positive contact and reduced threat, but diversity also had a negative direct effect on trust. This direct effect might have been caused via the remaining influence of diversity on negative contact. In either case, these findings suggest that diversity can promote negative as well as positive contact. An important question that remains for future research will be to determine the moderating factors that maximize the influence of diversity on positive contact and minimizes its influence on negative encounters. Potential moderators include perceived threat, which might facilitate negative contact (Brown & Hewstone, 2005; Devine et al., 2001; Schmid et al., 2014), or favourable attitudes towards immigrants, which might promote positive contact (B. P. H. Hui, Chen, Leung, & Berry, 2015; Pettigrew, 1998). Understanding how diversity can lead to episodes of positive contact should be especially important since positive contact seems to be the key factor for long-term cognitive change in response to diverse environments.

To reiterate the main findings in this chapter, findings from three studies consistently demonstrated that living in an ethnically diverse area is linked to positive interethnic contact. Positive contact was associated with a tendency to reject conformity and feeling unconstrained by rules and conventional norms. An underlying theme of these

findings is that participants who experienced a lot of diversity seem to show flexibility towards categorical thinking (such as explicit rules or norms). Categories are primarily a mechanism to simplify and speed up processing of information by enforcing structure (McGarty et al., 2004), and categorical structure is the epistemic core of rule or norm adherence. A low reliance on categorical thinking should therefore also go hand in hand with tolerance towards ambiguous information with low structure as indicated by a low need for cognitive closure (Kruglanski & Webster, 1996; Webster & Kruglanski, 1994). This idea was further explored in three studies presented in the following chapter.

CHAPTER 7: DIVERSITY AND EPISTEMIC NEEDS

Findings from Studies 4-6 suggest that experiencing diversity is associated with a flexible stance towards cognitive categories. Categorical thinking, however, satisfies the epistemic needs for cognitive closure and structure, because it structures perceptions and enables quick judgements and decisions. Decreased categorical thinking should thus be accompanied by a higher tolerance towards ambiguity and uncertainty, as indicated by a low need for closure and a low need for structure. If categorical thinking is reduced in response to diversity, it should consequently also lead to a decreased need for closure and structure. This idea was tested in three studies presented in this chapter. Across 3 studies frequent positive contact was found to be associated with a low need for cognitive closure (Study 7a & 7b) and a low need for structure (Study 8). Implications of these results and the common themes of findings in this and the previous chapter are discussed.

In Chapter 5 I presented a revised version of the CPAG model (Crisp & Turner, 2011) by specifying a new adaptation process to diversity. The hypothesised adaptation process involves a reduced reliance on categorical thinking and cognitive flexibility towards categorical boundaries. Such flexibility towards categories has been commonly observed as a result of experiences of diversity in creativity tasks (e.g. Cheng et al., 2011; Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Gutierrez & Sameroff, 2008; Maddux et al., 2010; Tadmor, Galinsky, et al., 2012). I predicted that this flexible stance on categorical information should generalise and manifest itself for the perception of social norms. This hypothesis was tested for majority members in three studies reported in the previous chapter. These studies demonstrated that experiences of diversity for majority

members indeed lead to favouring an aversion towards conventional traditions, rules and confirmatory pressure.

Social rules inform human behaviour by offering behavioural scripts, organised sequences of stereotypical behaviour that are regarded as appropriate for a specific category of situation. The behavioural scripts associated with norms represent a form of schemata. They thus serve the same purpose as other categorical rules in the sense that they structure information and simplify decision-making by offering shared behavioural scripts for various situations (e.g. eating out might activate a “restaurant” script, which includes the behavioural script of “tipping the waiter”, Abelson, 1981; Bicchieri, 2005; Raven & Rubin, 1976; Schank & Abelson, 1977).

The reliance on such social rules was reduced for people who have experienced a lot of positive contact in Studies 4-6. This fits with the idea that experiences of diversity promote a flexible stance on categorical information in general. It also suggests that participants who experienced a lot of diversity are more comfortable with complex information as they seem to rely less on categorical thinking to simplify and structure their perception. In other words, they are more tolerant towards uncertainty and have a low desire to seek immediate closure by resolving ambiguity through categorical structures.

It therefore follows that individuals who experienced a lot of diversity should score low on the Need for Closure scale (NFCC; Kruglanski & Webster, 1996; Webster & Kruglanski, 1994). Need for closure has been associated with many factors that have a negative relationship with diversity. Need for Closure has been found to relate to heightened conformity (Chirumbolo et al., 2004; De Grada, Kruglanski, Mannetti, & Pierro, 1999; Fu et al., 2007) and conservative values (Hiel, Pandelaere, & Duriez, 2004; Jost, Glaser, Kruglanski, & Sulloway, 2003; Kossowska & Hiel, 2003; Onraet, Van Hiel,

Roets, & Cornelis, 2011). Individuals high in NFCC prefer to be guided by clear and absolute rules, as demonstrated in their preference of absolute moral systems with unambiguous rules without exceptions (Van Kenhove, Vermeir, & Verniers, 2001). Furthermore, individuals with high NFCC tend to do well on cognitive control tasks that involve clear and specific rules (Kossowska et al., 2014; Kossowska, 2007a, 2007b).

Preference for conformity, conservative values and clear unambiguous rules have thus been linked to high levels of NFCC but have also been found to be low among participants with a lot of diversity experiences in Studies 4-6. In a similar vein, previous studies have also found that experiencing diversity can foster relativistic moral attitudes (Lu et al., 2017). High NFCC has also been linked to strong performance on simple cognitive control tasks, precisely the type of task participants with a lot of diversity experience performed poorly on when diversity was made salient in Studies 1-3. A lowered need for cognitive closure due to experiences of diversity might therefore indicate why participants in the preceding studies who had experienced a lot of diversity tended to prefer less conformity, were low in conservative values, and showed impaired self-regulation when diversity was salient.

Hence, a low need for closure might reflect the underlying adaptation process to diversity which involves a flexible stance on cognitive rules and norms and a high degree of tolerance towards uncertainty. In support of this idea, spontaneously diversifying experiences have been found to lead to a decreased need for cognitive closure (Tadmor, Hong, et al., 2012). However, the effect of multicultural experiences on NFCC in this work has only been demonstrated by either inducing multicultural experiences in the lab or by measuring multicultural experiences using the MES. Such findings are certainly well suited to demonstrate the effect of experiencing diversity in general on NFCC. However, it is unclear if this relationship generalises to the experiences of majority

member living in an ethnically diverse environment. Effects of induced multicultural experiences might not necessarily lead to a prolonged decrease in need for closure, and the types of experiences of diversity tapped by the MES are too broad to allow specific conclusions about the experiences of diversity of majority members. Furthermore, Studies 1-4 raise the possibility that some responses to diversity are only active when diversity is salient. Thus, individuals might possess the ability to process stimuli with great cognitive flexibility, relying relatively little on rigid categorical boundaries. However, they might only switch to such a mode of processing when it is relevant, namely when it is likely that they will process socially diverse stimuli (i.e. when diversity is salient). It therefore seems reasonable to test whether effects of diversity on NFCC only occur when diversity is made salient.

This prediction was tested in three studies described below. More specifically, these studies examined how experiences of diversity influence the desire for clear structure and cognitive closure, and if this influence would be moderated by salient diversity.

7.1 Study 7a: Diversity and Need for Cognitive Closure

This study examined the extent to which exposure to diversity and positive contact lead to a decreased need for cognitive closure, and if this effect was moderated by the salience of diversity.

7.1.1 Method

Participants. For this study, 127 White British participants were recruited via prolificacademic.co.uk in exchange for monetary payment. To participate, the participant's hometown had to be located in England. Also, he or she had to be a student, and had to access the survey from a non-mobile device. The participants (47 female, 80

male) were aged between 16 and 65 years ($M = 25.28$, $SD = 7.29$). Some participants had missing data. 119 participants provided data for all variables.

Procedure and materials. Participants were randomly assigned to one of two conditions (diversity salience or control). In the diversity salience condition, participants were reminded of their experiences of diversity before they continued questions on their need for cognitive closure.

As in the previous two studies, participants received demographic questions (identical to previous studies) and questions on their experiences of diversity. They also completed the need for cognitive closure scale.

Experiences of diversity. To measure experiences of diversity, participants received the same questions on past and current subjective exposure to diversity, frequency and quality of positive contact as in Study 6. An additional question was added to the frequency of positive contact scale (“How often did you have positive contact with people from ethnic backgrounds different from your own?”). Two items were added to the quality of positive contact scale (Feeling “*grateful*” and “*inspired*” during interethnic exchanges). Both expanded scales showed good or better internal consistencies *Cronbach's* $\alpha > .88$.

Need for cognitive closure. Need for cognitive closure was assessed using the Need for Closure Scale developed by (Webster & Kruglanski 1994; reported in Appendix Q). It captures the epistemic need to achieve firm, definite answers to ambiguous problems. Need for closure is measured by items such as “I enjoy having a clear and structured mode of life.”. Items are scored on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). The scale showed good internal consistency in this study, *Cronbach's* $\alpha = .85$.

Conditions. As in previous studies, the order in which these materials were presented to participants depended on the condition.

Diversity salience condition. After receiving demographic questions, participants answered questions about their exposure to diversity and positive interethnic contact. This served as a prime for diversity. Subsequently, participants completed the Need for Cognitive Closure scale.

Control condition. In the control condition, participants received the NFCC scale before continuing with questions on their experiences of diversity.

7.1.2 Results

As for Studies 2-6, the data is theoretically nested within the geographic area of participants' home districts. However, a conventional unilevel analysis is still likely to produce unbiased estimators if the underestimation of standard errors due to clustering is relatively low (Maas & Hox, 2005). The underestimation of the standard error due to clustering can be indicated by the design effect. A design effect below two is considered small and indicates that a conventional unilevel analysis should not lead to overly misleading results (Maas & Hox, 2005; Muthen & Satorra, 1995, also see Chapter 4).

I therefore first assessed the necessity for a multilevel approach. Design effects for the dependent variables were very small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.24$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of $\alpha = .05$. All results reported below were controlled for gender, age, subjective SES and communal SES for home district and current district.

Outlier exclusion and data inspection. To ensure that participants paid sufficient attention to the questions and that the manipulation of diversity salience would be effective, participants who took an unusually long time to complete the questionnaire

were excluded from analysis, using the same criteria as in the previous studies. The median time in minutes for completing the study was $Mdn = 9$. Using the same criteria as in previous studies all participants taking longer than 34 minutes were omitted from analysis. This led to the exclusion of one participant with 126 remaining participants (118 provided data for all variables).¹⁷

Early diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for past diversity. In contrast, current diversity showed a normal distribution.

Early experiences of diversity and NFCC. The effect of early experiences of diversity on need for closure was investigated by fitting a GLM to the data. Diversity of participants' home district as well as frequency and quality of positive interethnic contact while growing up were entered as independent variables and need for cognitive closure (NFCC) was treated as the dependent variable. The same controls were added to the model as covariates as in the previous studies.

Need for closure was significantly affected by the condition*frequency of contact interaction, $F(1, 106) = 5.20, p = .03$, partial $\eta^2 = .05$. It was also significantly predicted by the condition*quality of contact interaction, $F(1, 106) = 9.76, p = .002$, partial $\eta^2 = .08$.

¹⁷ Inclusion of the outlier lead to similar conclusions for early diversity, with a significant condition*frequency of contact interaction, $F(1, 107) = 4.73, p = .03$, partial $\eta^2 = .04$, and a significant condition*quality of contact interaction, $F(1, 107) = 9.21, p = .003$, partial $\eta^2 = .08$. No other main effect or interaction effect reached significance when the outlier was included, $F_s < .42, p_s > .52$. Regarding recent diversity, inclusion of the outlier also made little difference for the findings with a significant interaction between frequency of positive contact and condition, $F(1, 92) = 4.23, p = .04$, partial $\eta^2 = .04$, and a significant quality of contact*condition interaction, $F(1, 92) = 6.51, p = .01$, partial $\eta^2 = .07$. Still, no other main effect or interaction effect with condition reached significance when the outlier was included, $F_s < 1.94, p_s > .16$.

No other main effect or interaction effects with condition reached significance, $F_s < .40$, $p_s > .52$.

The interaction effects were further investigated with a moderation analysis in PROCESS. This analysis revealed that frequency of positive contact had no impact in the control condition, *standardised effect* = .22, $t(106) = 1.25$, $p = .21$, 95% *CI* [-.13, .56]. When diversity was salient, however, more positive contact marginally predicted a lower need for closure, *effect* = -.38, $t(106) = -1.94$, $p = .06$, 95% *CI* [-.78, .01]. This moderation effect is also displayed in Figure 14.

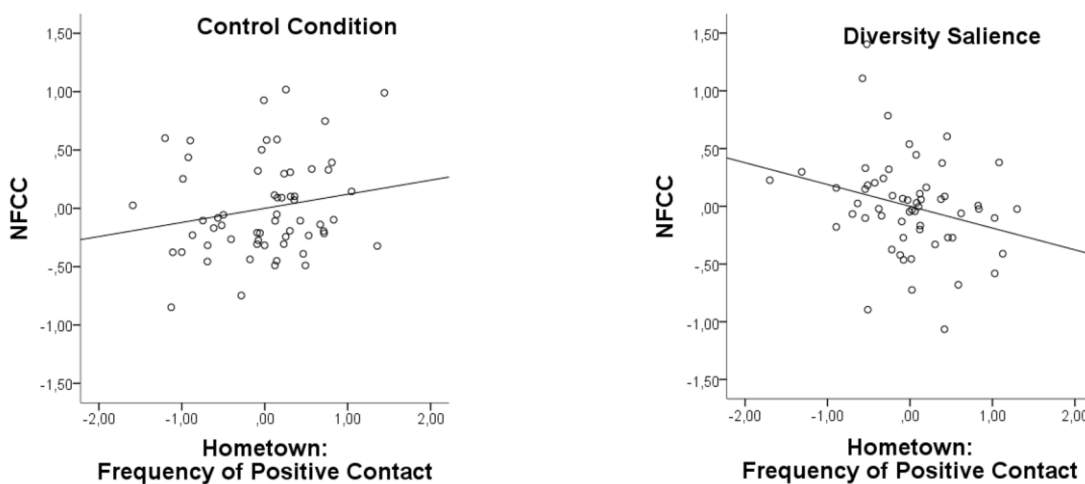


Figure 14. Partial regression plots of the frequency of early positive contact and Need for Cognitive Closure scores (NFCC) with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal SES), early exposure to diversity and quality of positive contact.

Quality of positive contact, however, showed an unexpected pattern: Quality of positive contact predicted lower need for closure in the control condition, *standardised effect* = -.42, $t(106) = -2.60$, $p = .01$, 95% *CI* [-.75, -.10], but for salient diversity it

predicted a marginally *stronger* need for closure, *standardised effect* = .38, $t(106) = 1.97$, $p = .052$, 95% *CI* [-.003, .77]. This moderation is depicted in Figure 15.

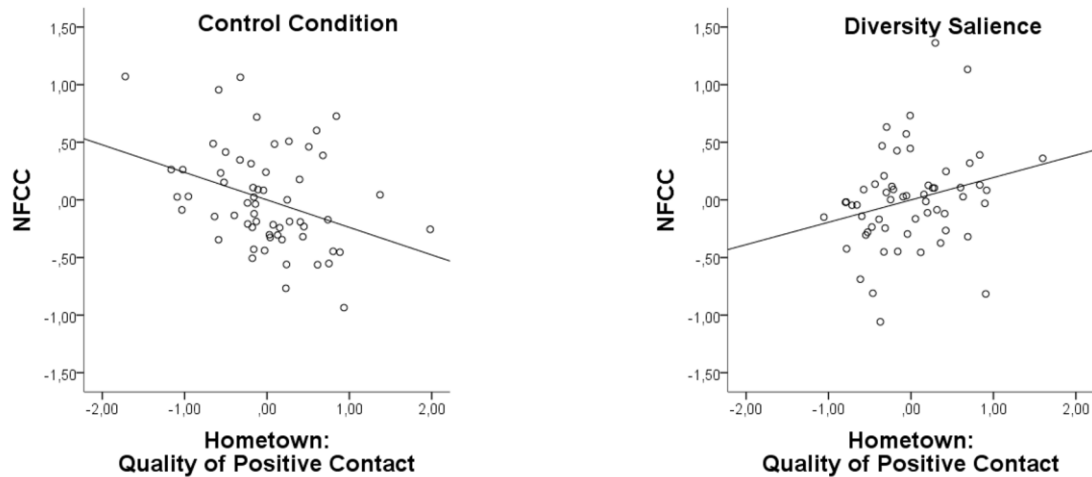


Figure 15. Partial regression plots of the quality of early positive contact and Need for Cognitive Closure scores (NFCC) with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal SES), early exposure to diversity and frequency of positive contact.

Recent experiences of diversity and NFCC. A similar GLM was fitted for current diversity. This model used diversity of the current residence as well frequency and quality of positive contact of the past 6 months as predictors. The interaction between frequency of positive contact and condition emerged as significant predictor, $F(1, 91) = 4.30$, $p = .04$, partial $\eta^2 = .05$. Also, the quality of contact*condition interaction reached significance $F(1, 91) = 6.63$, $p = .01$, partial $\eta^2 = .07$. No other main effect or interaction effects with condition reached significance, $F_s < 1.99$, $p_s > .16$.

The interaction effects were followed upon by a moderation analysis in PROCESS. This analysis showed that frequency of positive contact had no impact in the control condition, *standardised effect* = .12, $t(91) = .71$, $p = .48$, 95% *CI* [-.22, .47]. When

diversity was salient, however, more positive contact marginally predicted a lower need for closure, *standardised effect* = $-.66$, $t(91) = -1.98$, $p = .0502$, 95% *CI* $[-1.31, .001]$.

This moderation effect can also be seen in Figure 16.

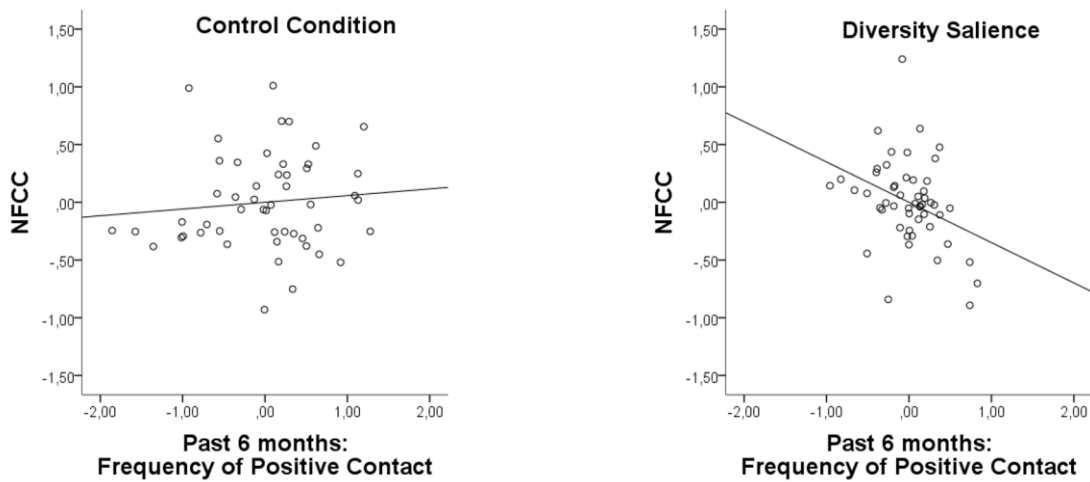


Figure 16. Partial regression plots of frequency of recent positive contact and Need for Cognitive Closure scores (NFCC) with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal SES), recent exposure to diversity and quality of positive contact.

Quality of positive contact, however, again showed an unexpected pattern: Quality of positive contact marginally predicted lower need for closure in the control condition, *standardised effect* = $-.35$, $t(91) = -1.80$, $p = .08$, 95% *CI* $[-.74, .04]$, but when diversity was salient it predicted a marginally *stronger* need for closure, *standardised effect* = $.57$, $t(91) = 1.92$, $p = .06$, 95% *CI* $[-.02, 1.15]$. This moderation is depicted in Figure 17.

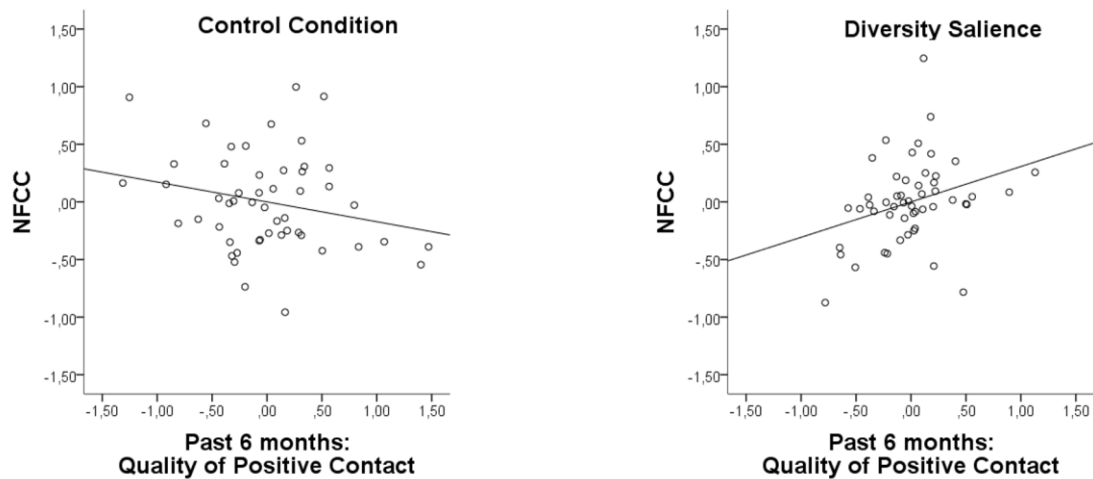


Figure 17. Partial regression plots of quality of recent positive contact and Need for Cognitive Closure scores (NFCC) with fitted regression lines, displayed per condition. Partial regression plots are adjusted for control variables (age, gender, subjective SES, communal SES), recent exposure to diversity and frequency of positive contact.

Mediation analysis. Early and recent exposure to diversity had no effect on NFCC in the previous analysis. However, diversity might still have affected NFCC through positive contact, and this mediation might be further moderated by salient diversity. I therefore conducted a mediation analysis in PROCESS.

First, it was tested if any aspect of positive contact mediated the effect of diversity across conditions. No indirect effect of diversity via frequency or quality of positive contact was found. This was true for early as well as recent experiences of diversity, *standardised abs* < .03.

As in previous studies, it was also tested for moderated mediation. The tested model assumed an indirect influence of diversity through either quality or frequency of contact with the direct and indirect path moderated by condition (model 15 in PROCESS; Hayes, 2013). As shown in Figure 18, there was a moderated mediation with the quality of positive contact mediating the effect of diversity *index* = .08, 95% *CI* [.002, .25]. The

indirect effect of positive contact was moderated by condition, $interaction = .22, t = 2.10, p = .04$. A trend indicated that an indirect effect of diversity through quality of contact was present in the control condition, predicting lower need for closure, $standardised ab = -.06, 95\% CI [-.19, .002]$. No indirect effect was present when diversity was salient, $standardised ab = .02, 95\% CI [-.02, .11]$. The remaining direct effect was insignificant for both conditions, $standardised c's < .12, ts < .85, ps > .40$. Regarding the other tested mediations, no further mediated moderation was present, $standardised indices < .02$.

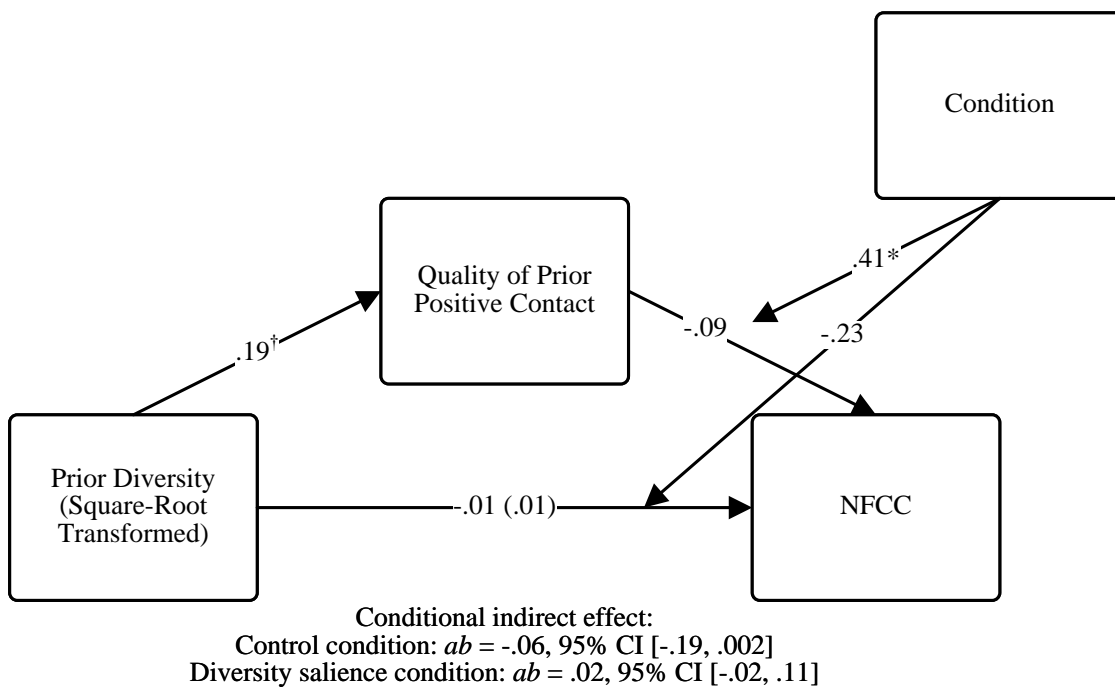


Figure 18. Relationship between early exposure to diversity and Need for Cognitive Closure (NFCC) as mediated by quality of positive contact and moderated by condition. Coefficients are standardised, except for interaction effects with condition. The regression coefficient between early diversity and NFCC, controlling for quality of early positive contact, is given in parenthesis. $^\dagger p < .10$ $* p < .05$. $*** p < .001$.

Power analysis. The ability of this study to detect a multivariate interaction effect of diversity salience and diversity experiences on the dependent variables was evaluated by a power analysis. The population effect size was estimated to be $\eta^2 = .05$. The power of this study for this population effect size was $power = .70$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .06$ at $power = .80$.

7.1.3 Discussion

When diversity was salient, participants with frequent positive contact were less inclined to seek immediate closure. This effect was present for early positive contact before reaching adulthood as well as for more recent episodes of interethnic contact. These results fit with the findings reported in Chapter 6 in the sense that individuals with a lot of positive contact felt less inclined to enforce closure and structure by relying on categorical rules. This seemed to be especially true in situations where diversity was salient (Study 4 and 6).

However, salient diversity had a different moderating effect on the quality of positive contact. Positive contact with high quality predicted low NFCC under neutral conditions, but trends indicated that salient diversity might reverse this effect, with high-quality contact predicting *high* NFCC. Again, the same pattern was found for early as well as recent episodes of positive contact. This raises the possibility that intense episodes of high-quality of contact lead to different response patterns than contact that occurs frequently but might have a low emotional impact. This possibility will be further explored in the following studies.

There might have been methodological shortcomings with the quality of contact scale used in this study. While the scale for quality of contact used in Studies 5 and 6 was intended to indicate the positive intensity of the contact, the anchors employed in this

scale indicated frequency rather than the strength of the experienced emotion ('How often did you feel the following emotions?', anchors from 1 – *Never* to 5 – *Very Often*). Participants might have indicated the frequency of high-intensity contact on these items, rather than the positivity of contact. Effects of the quality of contact scale might thus fail to represent the impact of the relative positivity of interethnic contact, but rather represent the impact of relatively rare emotionally intense episodes of intercultural contact. Therefore, a further study was conducted to replicate the findings from this study with a more refined version of the quality of contact scale.

7.2 Study 7b: Diversity and Need for Cognitive Closure II

Procedure and materials of this study were identical to Study 7a, except for different items for quality of interethnic contact.

7.2.1 Method

Participants. For this study, 187 White British participants were recruited via prolificacademic.co.uk in exchange for monetary payment. To participate, the participant's hometown had to be located in England. Also, he or she had to be a student, and had to access the survey from a non-mobile device. The participants (88 females, 96 males, 3 other) were aged between 16 and 56 years ($M = 23.91$, $SD = 6.56$). Some participants had missing data. 173 participants provided data for all variables.

Procedure and materials. Procedure and materials were identical to Study 7a, except for different questions for quality of positive contact. Participants were asked to indicate how they experienced their interethnic contact (separately for early and recent contact): "When you met people from different ethnic backgrounds (while growing up in your hometown/in the past 6 months), in general did you find the contact...", and rated their contact on three attributes (*pleasant*, *cooperative*, *natural*) on a Likert scale from 1 (*not at all*) to 5 (*extremely*). This revised scale is reported in Appendix R. The revised

scale showed good internal reliability, *Cronbach's* $\alpha > .89$. The correlation between the different aspects of positive contact is shown in Table 11.

Table 11

Intercorrelations for Positive Contact Measures in Study 7b

Variable	1	2	3	4
1. Hometown: Positive Contact - Frequency	-			
2. Hometown: Positive Contact - Quality	.14 [†] (179)	-		
3. Past 6 Months: Positive Contact - Frequency	.29 ^{***} (179)	.70 ^{***} (179)	-	
4. Past 6 Months: Positive Contact - Quality	.39 ^{***} (182)	.52 ^{***} (179)	.39 ^{***} (179)	-

Note: Degrees of freedom for significance tests are given in parenthesis. [†] $p < .10$. * $p < .05$.

** $p < .01$. *** $p < .001$

7.2.2 Results

I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were very small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.03$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of $\alpha = .05$. All results reported below were controlled for gender, age, subjective SES and communal SES for home district and current district.

Outlier exclusion and data inspection. To ensure that participants paid sufficient attention to the questions and that the manipulation of diversity salience would be effective, participants that took an unusually long time to complete the questionnaire were excluded from the analysis, using the same criteria as in the previous studies. The median time in minutes for completing the study was $Mdn = 10$. Using the same criteria as in

previous studies all participants taking longer than 31 minutes were omitted from analysis. This led to the exclusion of three participants with 184 remaining participants (170 provided data for all variables).¹⁸

Past diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for past diversity. In contrast, current diversity showed a normal distribution.

Early experiences of diversity and NFCC. The effect of early experiences of diversity on need for closure was investigated by fitting a GLM to the data. Diversity of participants' home district as well as frequency and quality of positive interethnic contact while growing up were entered as independent variables and need for cognitive closure (NFCC) was treated as the dependent variable. The same controls were used as covariates as in the previous studies. No main or interaction effects with condition reached significance, $F_s < 2.53$, $p_s > .11$.

Recent experiences of diversity and NFCC. A similar GLM was fitted for current diversity. This model used diversity of the current residence as well frequency and quality of positive contact of the past 6 months as predictors. Frequent positive contact predicted lower need for closure, $F(1, 147) = 8.80$, $p = .004$, $partial \eta^2 = .06$, $\beta = -.31$. No other main effect or interaction effects with condition reached significance, $F_s < 2.45$, $p_s > .11$.

¹⁸ Conclusions changed only slightly when outliers were included in the analysis with quality of early contact being marginally significant as a predictor of lower NFCC, $F(1, 173) = 2.75$, $p = .099$ $partial \eta^2 = .02$. No main or interaction effects with condition reached significance for early experiences of diversity when outlier were included, $F_s < 2.27$, $p_s > .14$. Regarding recent diversity, frequent positive contact still predicted lower NFCC, $F(1, 149) = 8.30$, $p = .01$, $partial \eta^2 = .05$. No other main effect or interaction effects with condition reached significance for recent diversity when outliers were included, $F_s < 2.02$, $p_s > .15$.

Mediation analysis. It was also tested if diversity might affect NFCC through either frequency or quality of contact. No reliable pattern of mediation was present, *standardised abs* < .22. Testing if such a mediation might be moderated by condition also found no reliable evidence for moderated mediation, *standardised indices* < .09.

Power analysis. The ability of this study to detect a multivariate interaction effect of diversity salience and diversity experiences on the dependent variables was evaluated by a power analysis. Based on the findings of previous studies, the population effect size was estimated to be $\eta^2 = .05$. The power of this study for this population effect size was *power* = .77. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .054$ at *power* = .80.

7.2.3 Discussion

Participants who had experienced frequent episodes of positive interethnic contact in the past 6 months generally had a low desire for immediate closure and definite structure. This effect was stable across condition, regardless of the salience of diversity. This finding differs from results in the previous study in the sense that the effect of frequency of contact on NFCC in Study 7a was only present when diversity was salient. The role of salient diversity as a moderating factor thus warrants further investigation. However, the results from the current study underscore the impact of frequent positive contact on NFCC.

The effect of the quality of recent positive contact seems to be somewhat more inconsistent across the two studies. In Study 7a quality of contact was found to lead to lower NFCC under neutral conditions, with a marginal reversal of the effect when diversity was made salient. In this study, high-quality interethnic contact was found to not have any effect on NFCC.

While recent positive contact showed effects on NFCC in this study, there were no effects of early diversity. This is somewhat surprising, given that the effects of diversity on norm perception and values seemed to be more consistent for early than for recent diversity in Studies 4-6 (Chapter 6). This might suggest that epistemic needs such as NFCC are more malleable than values, and that recent experiences are more influential on epistemic needs than early experiences.

While there are some inconsistencies across the two studies, evidence does converge on the role of the frequency of positive interethnic contact. Frequent positive contact with ethnic minorities within the past six months was associated with a low need for definite closure. This supports the idea that prolonged experiences of diversity are linked to a high tolerance towards ambiguous information and uncertainty. This idea was further tested in another study using another measure focussing on the need for simple and definite structures, the Personal Need for Structure Scale (PNS; Neuberg & Newsom, 1993).

7.3 Study 8: Diversity and Need for Personal Structure

The third study testing the relationship between diversity and epistemic needs sought tested the influence of diversity on the need for structure. If diversity leads people to rely less on categorical this tendency might not only be facilitated by a decreased desire for concrete, unambiguous answers (as measured by NFCC), but also a relaxed need for clearly defined structures (as measured by PNS).

Tolerance towards a lack of structure (i.e. low PNS) might develop as people rely less on categorical thinking, because providing unambiguous structure is precisely the reason cognitive categories are used at all (eg. McGarty, 1999). Categorical thinking is thus employed to reach definite and immediate closure by enforcing clear and unambiguous structure on the individual's perception of their environment. The decreased

reliance on categories in response to prolonged experiences of diversity should thus not only be reflected in a low need for cognitive closure, as demonstrated in Study 7a and 7b, but also in a decreased need for structure.

7.3.1 Method

Participants. For this study, 175 White British participants were recruited via prolificacademic.co.uk in exchange for monetary payment. To participate, the participant's hometown had to be located in England. Also, he or she had to be a student, and had to access the survey from a non-mobile device. The participants (82 female, 90 male, 1 other) were aged between 17 and 51 years ($M = 23.25$, $SD = 6.34$). Some participants had missing data. 161 participants provided data for all variables.

Procedure and materials. Procedure and materials were identical to Study 7b, except for exchanging NFCC as dependent variable for the Personal Need for Structure Scale (PNS; Neuberg & Newsom, 1993).

Personal Need for Structure. The Personal Need for Structure Scale measures to what extent people prefer and are more comfortable with simple, well-defined structure. People high need for structure tend to enforce cognitive structure by relying on simplified generalisations in their judgements (Neuberg & Newsom, 1993; see Appendix S for the full scale). The PNS scale contains 12 items such as “It upsets me to go into a situation without knowing what I can expect from it.”, and is scored on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*).

7.3.2 Results

I first assessed the necessity for a multilevel approach. Design effects for the dependent variables were small for all geographic levels (district, county and region) for early as well as current place of residence ($DEs < 1.65$). Therefore, a multilevel analysis was not conducted. All statistical tests were carried out with a level of significance of α

= .05. All results reported below were controlled for gender, age, subjective SES and communal SES for home district and current district.

Outlier exclusion and data inspection. To ensure that participants paid sufficient attention to the questions and that the manipulation of diversity salience would be effective, participants that took an unusually long time to complete the questionnaire were excluded from the analysis. This was done using the same criteria as in the previous studies. The median time in minutes for completing the study was $Mdn = 6$. Using the same criteria as in previous studies all participants taking longer than 21 minutes were omitted from analysis. This led to the exclusion of five participants with 170 remaining participants (157 provided data for all variables).¹⁹

Past diversity had a non-normal, positively skewed distribution. The distribution could be improved by performing a square root transformation on the data. The following analysis was therefore carried out with the square root transformed data for past diversity. In contrast, current diversity showed a normal distribution.

Early experiences of diversity and PNS. The effect of early experiences of diversity on PNS was investigated by fitting a GLM to the data. Diversity of participants' home district as well as frequency and quality of positive interethnic contact while growing up were entered as independent variables, and personal need for structure was treated as the dependent variable. The same controls were used as covariates as in the previous studies. Quality of contact was associated with a marginally lower need for

¹⁹ Findings were similar when outliers were included in the analysis with quality of early contact still being a marginally significant predictor for low PNS, $F(1, 147) = 2.80, p = .097$, partial $\eta^2 = .02$ and no other significant main or interaction effects emerging from analysis for early diversity, $F_s < .51, p_s > .47$. Regarding recent diversity, frequent positive contact still predicted low PNS when outliers were included in the analysis, $F(1, 138) = 4.51, p = .04$, partial $\eta^2 = .03$. There were also no other significant main or interaction effect when outliers were included, $F_s < 1.40, p_s > .23$.

structure, $F(1, 144) = 2.78, p = .098$, partial $\eta^2 = .02, \beta = -.20$. The remaining main effect and interaction effects with condition were not significant, $F_s < .49, p_s > .49$.

Recent experiences of diversity and PNS. A similar GLM was fitted for current diversity. This model used diversity of the current residence as well frequency and quality of positive contact of the past 6 months as predictors. Frequent positive contact predicted lower personal need for structure, $F(1, 135) = 5.31, p = .02$, partial $\eta^2 = .04$. No other main effect or interaction effects with condition reached significance, $F_s < 1.03, p_s > .32$.

Mediation analysis. It was also tested if diversity might affect NFCC through either frequency or quality of contact. No reliable pattern of mediation was present, *standardised abs* $< .02$. Testing if such a mediation might be moderated by condition also found no reliable evidence for moderated mediation, *standardised indices* $< .05$.

Power analysis. The ability of this study to detect an interaction effect of diversity salience and diversity experiences on PNS was evaluated by a power analysis. Based on the findings of previous studies, the population effect size was estimated to be $\eta^2 = .05$. The power of this study for this population effect size was *power* $= .82$. Furthermore, this study had an appropriate sample size to detect a minimum population effect size of $\eta^2 = .049$ at *power* $= .80$.

7.3.3 Discussion

Participants who had experienced frequent episodes of positive interethnic contact in the recent past reported a low need for structure. This effect was stable across condition, regardless of the salience of diversity. This pattern is thus similar to Study 7b, in which participants with frequent positive contact in the recent months showed a low NFCC across conditions. Findings from this study as well as Study 7b differs from results in Study 7a regarding the effect of salient diversity. The salience of diversity moderated the effect of frequent contact for Study 7a. This suggests that salient diversity might only

have limited impact on the effect of diversity experiences on epistemic needs. In either case, the consistent link of frequent positive contact with low NFCC and PNS emphasises the role of frequency of contact for epistemic needs.

Early experiences of high-quality contact were associated with marginally lower levels of PNS in this study. This is somewhat reminiscent of results from Study 7a, with quality of contact predicting low NFCC under neutral conditions. Unlike Study 7a, however, the influence of high-quality contact was not moderated by the salience of diversity. This finding also seems inconsistent with findings from Study 7b, in which high-quality contact was linked to higher NFCC.

It is therefore not clear from this data how the quality of positive contact influences the need for closure or the need for clearly structured information. A possible explanation might be that a third variable confounds this relationship and lead to inconclusive results. A potential unaccounted variable might be mood since remembering emotional intense positive encounters might have put participants in a good mood. Positive mood has been shown to lead to more heuristic processing that simplify and structure information (Bless, Fiedler, & Forgas, 2006). This includes the reliance on categorical thinking such as in the use of stereotypes (Bodenhausen, Kramer, & Süsser, 1994), and scripts (Bless et al., 1996). Use of such processes that simplify information and speed up processing would be in accordance with the need to seek closure and clear structure. Thinking of past episodes of high-quality positive encounters might thus lead to increased NFCC, because it put participants into a good mood. This would at least explain why quality of positive contact leads to a high NFCC when diversity was made salient in Study 7a, even if the default effect of high-quality interethnic encounters might be decreasing NFCC and PNS.

7.4 General Discussion

Over all three studies presented in this chapter, a high frequency of positive contact had an impact on the participants' epistemic needs. In two studies, reporting a high frequency of positive contact within the past 6 months predicted tolerance with ambiguity, as indicated by the NFCC and PNS scale (Study 7b & 8). In Study 7a, having had frequent episodes of positive contact either recently or during the past 6 months predicted a low need for low cognitive closure as well but only when diversity was made salient. Thus, participants who experienced many instances of positive contact seem to feel less inclined to enforce structure by simplifying information through the use of categorical thinking.

These results suggest that frequent positive contact leads to a decreased reliance on categories. In this sense, the findings are in line with results from Chapter 6, which also suggest a decreased reliance on categorical thinking as a response to frequent positive contact. In Studies 4-8 the decreased tendency towards categorical thinking manifested itself in a decreased preference for conformity (Study 4), a decreased reliance on rules and conventional values (Study 5 & 6), and a decreased desire for structure and closure (Studies 7a-8).

In most cases, these effects were visible across conditions, but in some cases, they were only present when diversity was salient (Study 4 & 7a). Current findings are thus inconclusive on whether frequent positive contact affects reliance on categorical thinking across situations or only when diversity is salient. At present, however, evidence seems to be more in favour of the idea that frequent positive contact leads to a decreased reliance on categorical thinking in general, with either no or only minimal moderating effects of salient diversity. The role of salient diversity for activating or strengthening cognitive change in response to diversity will be discussed in more detail in the following chapter.

While the effects of frequent positive contact were relatively consistent across studies, the effect of the quality of contact seems less clear. In some studies, experiences of high-quality contact predicted a low reliance on rules and adopting unconventional values (Study 6) as well as a lower need for structure (Study 8). These findings are similar to the effects of frequent positive contact in the sense that high-quality contact seems to be associated with a relaxed reliance on cognitive rules and categories as well. In other studies, however, high-quality contact seemed to antagonize the effects of frequent positive contact by predicting a higher need for cognitive closure either across conditions (Study 7a) or only when diversity was salient (Study 7b). As discussed above this might point to the existence of an unaccounted third variable, such as mood, influencing the results. It is possible that high-quality contact affects different factors that had opposing effects on the dependent variable. For example, high-quality contact might represent influential episodes of diversifying experiences that eventually lead to adapting a less rigid and non-categorical style of processing similar to the effect of frequent positive contact. At the same time, just remembering intense positive encounters might temporarily lead to increased mood. Positive mood could have led to more heuristic style of processing which would have led to a tendency to seek quick cognitive closure. Either way, it seems possible that the effects of high-quality positive contact are more complex than assumed and need to be further unpacked in future studies.

To summarise the key findings in this chapter, through three studies it was found that diversity affected the extent to which people feel the need to simplify information and seek immediate closure. Frequent positive contact was consistently linked with a high tolerance for ambiguity and a low need to enforce structure and cognitive closure by

simplifying information.²⁰ The broader implications of these findings in context with findings from previous chapters will be discussed in the next chapter.

²⁰ This conclusion is further qualified by a meta-analysis of Studies 7a-8 reported in the next chapter. More specifically, frequent positive contact was overall associated with a low need for clear structure when it occurred recently, $r = -.19$, $p = .001$, but not when it occurred while growing up, $r = -.03$, $p = .48$. The effect of frequent contact was not moderated by salient diversity regardless of when it occurred. However, salient diversity did moderate the overall effect of quality of contact on the need for clear structure. Generally, episodes of high-quality contact tended to be associated with a low need for structure only when diversity was not salient ($r = -.23$, $p = .001$ for early contact, $r = .09$, $p = .18$ for recent contact).

CHAPTER 8: GENERAL DISCUSSION

This chapter provides a summary of the theoretical framework developed in the earlier chapters as well as an overview of the empirical findings from the nine studies reported in this thesis. In this thesis, I have reported evidence that experiences of diversity lead to cognitive change for ethnic majority members. This cognitive response to diversity does not involve enhanced self-regulation, but rather through low reliance on categorical information. This chapter, discusses the theoretical implications of these findings as well as their limitations. This chapter also provides some suggestions for future research, as well as a discussion of the practical implications of the current findings.

8.1 Initial Theoretical Framework

This thesis explored how members of the ethnic majority in England respond to ethnic diversity. For this purpose, I integrated the theoretical framework of the CPAG model with literature on self-regulation, stereotype inhibition, norm perception and epistemic needs. By doing so this thesis aimed to a) investigate the effects of prolonged experiences of diversity for majority members and b) study the specific effects of diversity that might lead to heightened cognitive flexibility.

These research goals addressed shortcomings in the current literature. Research on the effects of prolonged diversity in everyday life has usually focussed either on the effects of biculturalism (e.g. Cheng et al., 2008; Saad et al., 2013) or on the impact of experiencing diversity abroad (e.g. Godart et al., 2015; Hellmanzik, 2013; Maddux et al., 2010; Maddux & Galinsky, 2009). This research suggests that diversity can promote a mode of thinking that is cognitively flexible. More research is needed, however, to generalise these findings to other kinds of experiences of diversity, as the types of

experiences of diversity studied tend to be exceptions rather than the norm for majority members. Biculturals do not necessarily experience diversity the same way than majority members, and most individuals will only spend a small portion of their lifetime abroad. As diversity increases and becomes commonplace it is likely to affect every member of society. Hence, diversity research should extend towards everyday episodes of diversity that are common for the ethnic majority.

The underlying mechanisms by which people respond to diversity needs empirical validation as well. A common long-term response to diversity is increased cognitive flexibility, as demonstrated by various findings (Crisp & Turner, 2011; Gutierrez & Sameroff, 2008; Leung & Chiu, 2010; Leung et al., 2008; Maddux et al., 2010; Tadmor, Galinsky, et al., 2012). It is assumed by the CPAG model that this occurs through enhanced inhibitory abilities, allowing for more efficient generative thought. However, it has not been tested if these specific mechanisms are actually affected by diversity.

In Chapter 2 I reviewed the research on social diversity and its long-term effects on cognitive tendencies. I argued that social diversity presents all members of a society with challenges. These challenges can concern one's sense of identity as in the case of immigrants trying to integrate different cultural identities into a coherent whole (Gołowska & Crisp, 2014; Nguyen & Benet-Martínez, 2007). But diversity does not only challenge minority members, as just observing and trying to make sense of a socially diverse environment presents a challenge in itself. Socially diverse societies harbour more members who integrate seemingly contradicting social identities. This leads to dense and complex social identities, which can no longer be adequately understood by relying on stereotypical knowledge (Hutter & Crisp, 2005; Kunda et al., 1990). In line with the CPAG model (Crisp & Turner, 2011), I have argued that the underlying theme for these challenges evoked by diversity is the need to resolve stereotypical inconsistencies, which

can be considered a conflict of categorical information. Adaptation to diversity thus requires people to be efficient in dealing with inconsistencies. According to the CPAG model, this is achieved by increased cognitive flexibility, as indicated by several studies showing cognitive flexibility and divergent thinking in response to diversity (Crisp & Turner, 2011; Gutierrez & Sameroff, 2008; Leung & Chiu, 2010; Leung et al., 2008; Maddux et al., 2010; Tadmor, Galinsky, et al., 2012). The increased flexibility in thought is assumed to stem from enhanced inhibition, which would allow for more efficient generative thought (Crisp & Turner, 2011).

This possibility was further explored in Chapter 3 by reviewing the research on stereotype suppression and self-regulation. I illustrated that inhibiting stereotypical content can be considered an act of executive control. Stereotype suppression has been shown to engage the same processes as other cognitive control tasks (Gordijn et al., 2004; Govorun & Payne, 2006), to be affected by ego depletion (Muraven, 2008; Payne, 2005), and to be depleting itself (Gordijn et al., 2004; Richeson & Shelton, 2003; Richeson & Trawalter, 2005b; Richeson et al., 2003, 2005). This point is also underpinned by neurological studies demonstrating that the ability to inhibit stereotypes is linked to neural correlates of cognitive control (Amodio et al., 2008; Bartholow et al., 2006; Cunningham et al., 2010; Richeson et al., 2003). Individuals who are regularly exposed to diversity should thus frequently have to engage in acts of self-regulation, namely the suppression of stereotypical information. Regularly employing self-regulation has been shown to lead to long-term benefits for cognitive control (Baumeister et al., 2006). These benefits apply across several domains, such as applying self-control when inhibiting aggressive behaviour (Denson et al., 2011; Finkel et al., 2009), making good food choices or adopting good spending habits (Oaten & Cheng, 2006). Since experiencing diversity is likely to demand the suppression of stereotypes, and since stereotype suppression requires

self-regulation, I suggested that diversity could potentially benefit self-regulatory ability. Experiences of diversity should be more common among majority members who have lived in socially diverse environments. I therefore hypothesized that majority members from ethnically diverse districts might show superior self-regulation. This idea was tested in Studies 1-3.

8.2 Empirical Findings on Diversity and Self-Regulation

The findings from these studies suggested that experiences of diversity were associated with indicators of *lower* levels of self-regulation. However, this effect was only present when diversity was made salient, suggesting that participants who have experienced a lot of diversity might activate a mindset that interfered either with self-regulatory ability or the motivation to self-regulate.

8.2.1 Studies 1 and 2

Studies 1 and 2 investigated the effect of diversity on self-reported impulsivity and ability to delay gratification. Diversity was operationalized as the ethnic diversity White British participants from England (i.e. majority members) were exposed to while they were growing up. In contrast to the predicted effects, Study 1 revealed that participants who experienced greater levels of diversity were marginally more likely to report weak delay gratification. This finding was replicated and qualified by Study 2, in the sense that participants from ethnically diverse environments reported significantly weaker delay gratification and marginally stronger impulsiveness. However, these effects were only present when diversity was made salient.

8.2.2 Study 3

The effects of diversity on inhibition found in Studies 1 and 2 were conceptually replicated and further qualified in Study 3. It was expected that not all types of experiences of diversity should necessarily lead to cognitive adaptation. The typical form

of experience with social diversity for majority members will be some form of contact with members of other ethnic groups. Naturally, such contact can be experienced as relatively positive or negative. It was assumed that only frequent episodes of positive contact should lead to the development of cognitive adaptation, because they provide ideal processing conditions for inconsistency resolution such as reduced intergroup anxiety and increased positive affect. Furthermore, this study also tested whether the effect of diversity on self-regulation would affect behavioural performance by using the Stroop task as a dependent variable. The results revealed that diversity did indeed affect Stroop performance via positive contact. The effect of positive contact on Stroop performance was moderated by condition, and analysis of the simple effects suggested that positive contact lead to marginally inferior Stroop performance when diversity was salient but had no effect under neutral conditions.

In combination with the results from Studies 1 and 2, these results suggest that individuals who have experienced a lot of diversity only show differences on self-regulation measures when diversity is salient. However, the direction of this difference was reverse to what was expected based on the literature. Experiences of diversity were related to *lower* scores on self-regulation measures when diversity was salient, suggesting that the long-term responses to diversity either involves an impaired self-regulatory ability or a low motivation to apply self-regulation. This also implies that for individuals who have experienced a lot of diversity, inhibition might not be as crucial for understanding socially diverse stimuli as it is for the general population. These findings called for a revaluation of the theoretical framework developed in Chapters 2 and 3.

8.3 Revised Theoretical Framework

Considering the findings from Studies 1-3, in Chapter 5 I revisited the theoretical framework developed in earlier chapters. I argued that the temporary decrease in

inhibitory performance observed when diversity was salient for participants who had experienced a lot of diversity suggests the activation of a mindset geared towards processing categorical inconsistencies. Such a mindset would promote non-categorical thinking with increased cognitive flexibility towards the use of social and other categories, with relatively blurry boundaries between categories.

This view is supported by studies showing that experiences of diversity predict flexible and divergent thinking as expressed in superior performance on creativity tasks (Leung & Chiu, 2010; Maddux et al., 2010; Maddux & Galinsky, 2009; Steffens et al., 2015; Tadmor, Galinsky, et al., 2012). When diversity is spontaneously induced in the laboratory, the activation of multiple competing social categories seems crucial for increasing creative thinking (Cheng & Leung, 2013; Cheng et al., 2011; Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Leung & Chiu, 2010). This suggests that the increase in creativity might stem from an enhanced ability to think about categories in a flexible manner. In some studies, the effect of diversity on creativity was moderated by salient diversity in the sense that the beneficial effect of diversity was either stronger when diversity was salient (Maddux et al., 2010; Maddux & Galinsky, 2009) or the effect was only present with salient diversity (Cheng et al., 2008; Saad et al., 2013). These findings support the view that diversity aids flexible and creative thinking because they enable people to switch to a mindset favouring cognitive flexibility.

Such cognitive flexibility with a decreased use of categorical information would also help to explain why individuals who have experienced a lot of diversity have been found to demonstrate high cognitive complexity (Benet-Martínez et al., 2006; Tadmor et al., 2009; Maddux, Bivolaru, Hafenbrack, Tadmor & Galinsky, 2014). That is, they are highly capable to acknowledge and integrate information from different viewpoints. A low reliance on categorical boundaries should make it easier to connect and integrate

ideas from different viewpoints (i.e. different categorical domains) and achieve high complexity.

However, this tendency to neglect categorical information might sometimes impair performance on tasks that require monitoring of concrete rules in the face of distracting stimuli such as certain cognitive control tasks. Decreased self-regulatory performance would not necessarily indicate an impairment in actual self-regulatory ability, but rather a decreased motivation to monitor cognitive rules. Detrimental effects of cognitive flexibility on self-regulatory performance have been demonstrated in studies investigating the influence of need for cognitive closure (NFCC; Kossowska et al., 2014; Kossowska, 2007a, 2007b). The idea that individuals who have experienced a lot of diversity tend to rely little on definite categories and rules is also corroborated by recent work showing a positive link between time spent abroad and a weak reliance on absolute moral rules (Lu et al., 2017). A reduced reliance on rules might explain the decreased self-regulatory performance when diversity was salient for participants who had experienced a lot of diversity in Studies 1-3: Participants' experience with diversity might have activated a mindset of high flexibility but low reliance on rules when diversity was salient, leading to poor performance on the measures of self-regulation.

I integrated these ideas with the CPAG model by offering a revised model of how people respond to diversity. Repeatedly experiencing diversity is assumed to lead to cognitive adaptation in the form of increased cognitive flexibility in dealing with categorical inconsistencies. However, this cognitive flexibility is not achieved by enhanced cognitive inhibition, as shown in Studies 1-3. Rather, it might be achieved by activating an adaptive mindset when cues for diversity are present. Such a mindset would favour a low reliance on categorical processing rules (such as social categories), allowing for increased flexibility.

Diversity should thus promote a tendency to rely less on categorical rules for information processing. I speculated that this tendency should generalise to social norms and conventions as well, a hypothesis that was tested in Studies 4-6.

8.4 Empirical Findings on Diversity and Conventionalism

Findings from these studies suggested that diversity in the form of positive contact is linked to a decreased reliance on conventional thinking. Specifically, positive contact was associated with resistance towards social conformity (Study 4), and a decreased reliance on rules and conventional values (Studies 5 and 6).

8.4.1 Study 4

Study 4 tested if diversity would affect the desire for social autonomy versus conformity, as measured by the SCA scale (Feldman, 2003). It also investigated if the decrease in self-regulation when diversity was salient for participants who had experienced a lot of diversity was mediated by an increase in social autonomy. Results showed that early diversity had an indirect positive effect on the preference for social autonomy via positive contact. Similar to Studies 1-3, this effect of early diversity was only present when diversity was made salient. However, in this study diversity had no effect on measures of self-regulation. Reports of self-regulation were still correlated with a strong preference for autonomy values. Therefore, it might still be plausible that a change in rule dependence might be partially responsible for the temporary decrease in self-regulatory performance observed in Studies 1-3.

8.4.2 Studies 5 and 6

The effect of diversity on the reliance on conventional norms and rules in general was further explored in Studies 5 and 6. Study 5 also investigated the impact of different types of experiences of diversity by measuring both negative as well as positive interethnic contact. Study 6 delved into specific aspects of positive contact by measuring

both quantity and quality of contact. Results from Study 5 revealed that early diversity predicted early positive contact and negative contact, but only positive contact influenced the dependent variables, predicting a low reliance on rules and conventional values. Current diversity predicted only positive contact which in turn promoted low conventional values. This effect was counteracted by recent negative contact, which predicted strong conventional values. Findings from Study 6 showed that frequent positive contact predicted a low willingness to submit to authorities, while the quality of positive contact promoted a low reliance on conventional values as well as rules in general.

Together with findings from Study 4 these results suggest that diversity is linked to a low reliance on rules, norms and authority. This supports the idea that diversity favours a low reliance on categorical rules over different domains. A reduced use of categorical rules runs counter to some epistemic needs such as the need for cognitive closure and the need for structure, because utilising categorical thinking is a key tool for enforcing structure and achieving quick closure (McGarty et al., 2004; Webster & Kruglanski, 1994). If diversity does favour a low reliance on categorical thinking, this cognitive change should also be accompanied by a high tolerance towards uncertainty, unstructured information and a low need for cognitive closure. This prediction was tested in Studies 7-8.

8.3 Empirical Findings on Diversity and Epistemic Needs

Findings from Studies 7-8 generally suggested that a high frequency of positive contact is linked to a low need for structure and immediate closure. However, results on the role of quality of positive contact were inconclusive.

8.3.1 Study 7a and 7b

Study 7a and 7b investigated if experiences of diversity would be linked to a lowered need for cognitive closure (NFCC) when diversity is salient. In both studies,

frequent positive contact within the past 6 months predicted a low need for closure. Furthermore, frequent positive contact while growing up was also a significant predictor of low NFCC in Study 7a. However, findings of the two studies diverge regarding the role of diversity salience. In Study 7a, the effect of frequent positive contact on NFCC was moderated by salient diversity, as frequent positive contact only predicted low NFCC when diversity was salient. In Study 7b, however, early frequent positive contact affected NFCC regardless of condition.

Results on the impact of quality of positive contact on NFCC were inconclusive across the two studies. In Study 7a, high quality contact predicted low NFCC under neutral conditions, but in Study 7b high quality contact was associated with high NFCC across conditions.

Findings from these studies suggest that frequent positive contact is linked to a high tolerance towards ambiguous information and delayed cognitive closure. If this tolerance towards uncertainty is caused by a decreased reliance on categorical rules it should also be accompanied by a decreased need for clearly structured information, as measured by the Personal Need for Structure Scale (PNS). This idea was tested in Study 8.

8.3.2 Study 8

Study 8 examined whether early or recent diversity would influence the need for structure as measured by the PNS scale, and if such an effect would be moderated by salient diversity. As in Study 7a and 7b, epistemic needs were decreased for participants who had experienced frequent episodes of positive contact. Need for personal structure was significantly lower for participants who experienced frequent positive contact in the recent past and marginally lower for participants who had early frequent positive contact while growing up. These effects were not moderated by salient diversity. Quality of

contact only had a marginal effect on PNS, with high quality of early positive contact predicting marginally lower levels of PNS.

Together with the findings from 7a and 7b these results offer converging evidence for the idea that frequent positive contact decreases epistemic needs. Frequent positive contact was linked to a low NFCC as well as low PNS. This suggests that participants who have experienced a lot of diversity are more comfortable with uncertainty, and therefore less likely to rely on categorical knowledge to resolve ambiguous information.

8.4 Meta-Analysis of Empirical Findings

I conducted a series of meta-analyses on the empirical findings reported in this thesis to obtain a realistic estimate of the sizes of the reported effects of experienced diversity. These meta-analyses are reported below. For all investigated effects, two separate meta-analyses for both levels of diversity salience were conducted. For studies which manipulated the salience of diversity (Studies 2-8), simple effects were split by the diversity salience condition and entered the appropriate meta-analysis. Whenever possible, the analyses focused on the effects of positive contact rather than mere exposure to diversity, as the current findings suggest that positive contact might be the most relevant type of experience for determining cognitive change in response to diversity. For all analyses, I used fixed effects in which the main effect size (i.e., mean correlation) was weighted by sample size. Effect sizes were first converted to Pearson's correlations if necessary. All correlations were then Fisher's z transformed for analysis and converted back to Pearson correlations for presentation.

8.4.1 Self-Regulation

I meta-analysed all studies reported in this thesis which measured the impact of early experiences of diversity on self-regulation (pilot study, Studies 1-4). Effect scores were reversed if necessary to indicate a positive effect on self-regulation. The main effect

for each study was determined by averaging the effect size across all measures of self-regulation employed in the study. For Study 3 and 4, positive contact was chosen as indicator for experiences of diversity. For earlier studies, mere exposure to diversity was used, as positive contact was not measured in these studies. All effect sizes for these meta-analyses are presented in Table 12.

Table 12

Effect Sizes for Meta-Analyses on Diversity Experiences and Self-Regulation.

	Mean effect r of early diversity experiences on self-regulation	n	Measures for Self-Regulation
Pilot Study			BIS
Diversity salient	-.22	50	Compulsive
Diversity not salient	-	-	Buying Scale
Study 1			BIS
Diversity salient	-.11	120	ADOG
Diversity not salient	-	-	
Study 2			BIS
Diversity salient	-.33	67	ADOG
Diversity not salient	.08	65	
Study 3			Stroop
Diversity salient	-.19	40	BIS
Diversity not salient	.02	53	ADOG
Study 4			BIS
Diversity salient	-.06	90	ADOG
Diversity not salient	.06	76	
Weighted Mean			
Diversity salient	-.16**	367	
Diversity not salient	.06	194	
Combined	-.09*	561	

Note: BIS-Brief = Barratt Impulsiveness Scale-Brief; ADOG = Academic Delay of Gratification Scale; † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

For salient diversity, the overall effect of diversity was significant, $mean r = -.16$, $Z = 3.07$, $p = .002$, such that more experiences of diversity were associated with weaker self-regulation. When diversity was not salient, the experiences of diversity had no effect

on self-regulation, $mean\ r = .06$, $Z = 0.76$, $p = .45$. This moderating effect of salient diversity was significant, as revealed by a contrast analysis, $Z = 2.98$, $p = 0.002$. These results thus support the conclusions from the separate studies in the sense that participants who have experienced a lot of diversity showed lower self-regulation, but only when diversity was first made salient.

8.4.2 Reliance on Conventional Values

I meta-analysed all studies reported in this thesis which measured the impact of early and current positive contact on conventional values (Studies 4-6). Only the effect of frequency of contact was investigated, as quality of contact was only included as a measure in Study 6. Effect scores were reversed if necessary to indicate an effect towards more conventionalism. The main effect for each study for was determined by averaging the effect size across all measures for reliance on conventional values employed in the study. All effect sizes for these meta-analyses are presented in Table 13.

For early experiences of diversity, the overall effect of frequent positive contact was significant for salient diversity, $mean\ r = -.26$, $Z = -3.97$, $p < .001$, such that more frequent contact was associated with a weaker reliance on social rules. When diversity was not salient, the overall effect was only marginally significant, $mean\ r = -.11$, $Z = -1.66$, $p = .097$. However, this difference in effect sizes was not sufficient evidence for a moderating effect of salient diversity, as revealed by a contrast analysis, $Z = 1.27$, $p = .20$. The effect sizes for both levels of diversity salience were therefore combined. The combined effect of frequent positive contact was significant, $mean\ r = -.19$, $Z = -4.00$, $p < .001$.

Table 13

Effect Sizes for Meta-Analyses on Frequency of Positive Contact and Conventional Values.

	Mean effect r of frequency of early positive contact on conventional values	n	Measures for conventional values
Early			
Study 4			
Diversity salient	-.40	90	SCA
Diversity not salient	-.08	76	
Study 5			Rule-independence
Diversity salient	-.19	104	RWA-
Diversity not salient	-.15	103	conventionalism
Study 6			Rule-independence
Diversity salient	-.09	42	RWA-
Diversity not salient	-.08	42	conventionalism RWA-submission
<hr/>			
Weighted Mean			
Diversity salient	-.26***	237	
Diversity not salient	-.11 [†]	221	
Combined	-.19***	458	
<hr/>			
Current			
Study 4			
Diversity salient	-.03	90	SCA
Diversity not salient	.00	76	
Study 5			Rule-independence
Diversity salient	.01	88	RWA-
Diversity not salient	-.14	91	conventionalism
Study 6			Rule-independence
Diversity salient	-.08	44	RWA-
Diversity not salient	-.10	45	conventionalism RWA-submission
<hr/>			
Weighted Mean			
Diversity salient	-.02	222	
Diversity not salient	-.08	212	
Combined	-.01	434	

Note: SCA = Social Conformity/Autonomy Scale; RWA = Right-Wing Authoritarianism;

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

For current experiences of diversity, the overall effect of frequent positive contact was neither significant when diversity was salient, $mean r = -.02$, $Z = -.35$, $p = .73$, nor

when diversity was not salient, $mean\ r = -.08$, $Z = -1.17$, $p = .24$. A contrast analysis showed no moderating effect of salient diversity, $Z = .45$, $p = .65$. Effect sizes were therefore combined for both levels of diversity salience. The combined effect of frequent positive contact on conventionalism was also not significant, $mean\ r = -.01$, $Z = -.11$, $p = .91$. These results agree with the conclusions from the separate studies in the sense that early experiences of diversity are much more impactful on conventional values than experiences made later in life. Indeed, more recent experiences of diversity seem to have no impact on conventionalism at all. There is also no reliable moderating influence of salient diversity on the effect of frequent contact on conventional thinking.

8.4.3 Need for Clear Structure

I meta-analysed all studies reported in this thesis which measured the impact of early and current positive contact on the need for clear structure as measured by the NFCC and PNS scales (Studies 7a-8). As all studies measured the frequency as well as the quality of positive contact, the effects of both factors were investigated. Effect scores were reversed if necessary to indicate a positive effect on the need for clear structure. All effect sizes for these meta-analyses are presented in Table 14.

For early experiences of diversity, the overall effect of frequent positive contact was neither significant when diversity was salient, $mean\ r = -.10$, $Z = -1.41$, $p = .16$, nor when diversity was not salient, $mean\ r = .03$, $Z = .41$, $p = .68$. A contrast analysis did not provide significant evidence for a moderating effect of salient diversity, $Z = 1.63$, $p = .103$. The effects were therefore combined for both levels of diversity salience. When the results of both levels of diversity salience were combined, the weighted mean effect across both levels was also not significant, $mean\ r = -.03$, $Z = -.70$, $p = .48$.

Table 14

Effect Sizes for Meta-Analyses on Positive Contact and Need for Clear Structure

	Average effect r on the need for clear structure		n	Measure for the need of clear structure
	Frequency of positive contact	Quality of positive contact		
Early				
Study 7a				
Diversity salient	-.26	.25	58	NFCC
Diversity not salient	.19	-.35	60	
Study 7b				
Diversity salient	.03	.00	84	NFCC
Diversity not salient	-.06	-.24	86	
Study 8				
Diversity salient	-.11	-.19	77	PNS
Diversity not salient	.00	-.13	80	
Weighted Mean				
Diversity salient	-.10	.00	219	
Diversity not salient	.03	-.23***	226	
Combined	-.03	-.12*	445	
Current				
Study 7a				
Diversity salient	-.35	.31	52	NFCC
Diversity not salient	.10	-.23	51	
Study 7b				
Diversity salient	-.24	.14	80	NFCC
Diversity not salient	-.18	.00	80	
Study 8				
Diversity salient	-.15	-.13	68	PNS
Diversity not salient	-.25	-.10	80	
Weighted Mean				
Diversity salient	-.24***	.09	200	
Diversity not salient	-.14*	-.09	211	
Combined	-.19***	-.02	411	

Note: NFCC = Need for Cognitive Closure; PNS = Personal Need for Structure;

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Episodes of high-quality contact experienced in the past had no impact on the need for clear structure, when diversity was salient, $r = .00$, $Z = .00$, $p = 1.00$. When diversity was not salient, however, the effect of quality of contact was significant, $r = -.23$, $Z = 3.48$, $p = .001$, such that a high quality of contact was associated with a low need for clear

structure. A contrast analysis showed that this moderating effect of salient diversity was significant, $Z = 2.73$, $p = .01$.

Regarding recent positive contact, frequent positive contact had a significant effect on the need for clear structure when diversity was salient, $mean\ r = -.24$, $Z = -3.37$, $p = .001$, but also when it was not salient, $mean\ r = -.14$, $Z = -2.03$, $p = .04$. Both effects were such that more frequent contact was associated with a lower need for clear structure. A contrast analysis did not provide significant evidence for a moderating effect of salient diversity, $Z = 1.44$, $p = 0.15$. The effect sizes were therefore combined for both levels of diversity salience. When the results of both levels of diversity salience were combined, the weighted mean effect across both levels was significant, $mean\ r = -.19$, $Z = -3.81$, $p = .001$.

Recent episodes of high-quality contact had no impact on the need for clear structure when diversity was salient, $r = .09$, $Z = 1.31$, $p = .19$, or when diversity was not salient, $r = -.09$, $Z = 1.34$, $p = .18$. While the separate effects were not significant, the effect was moderated by salient diversity, as revealed by a contrast analysis $Z = 2.15$, $p = 0.03$.

These findings suggest that for early experiences of diversity the intensity (i.e. quality) of positive contact is more impactful on the need for structure than the frequency, since only quality of early contact was associated with a low need for structure. The reverse seems to be true for more recent episodes of positive contact, with frequent positive contact being associated with a low need for structure. Furthermore, these results also suggest that the salience of diversity moderates the effect of the quality of positive contact, both for early as well as more recent episodes of contact. Salient diversity had no reliable moderating influence on the effect of frequent positive contact, however.

8.5 Theoretical Implications

Findings from the current investigation provide further support for the CPAG model (Crisp & Turner, 2011) as an overarching framework to explain and predict responses to prolonged experiences of diversity. Participants who had experienced a lot of diversity showed cognitive flexibility as indicated by their low NFCC and PNS scores (Studies 7a-8). The reported studies also show that diversity predicted individual differences for ethnic majority members specifically. This is noteworthy, because this group has not previously been studied in isolation regarding the effects of diversity. However, results from this investigation also expand the model as the reduced reliance on categorical rules seems to transfer and translate to less conventional values and beliefs as well (Studies 4-6). Possibly as a result of this low reliance on rule monitoring, experiences of diversity can also be linked to lower self-regulatory performance when diversity is salient (Studies 1-3). Furthermore, the findings reported in this work also seem to suggest some modification of the adaptation process assumed within the CPAG model.

8.5.1 Cognitive Adaptation to Everyday Diversity for Majority Members

The core element of adaptation to diversity, according to the CPAG model, is developing superior cognitive flexibility in regard to categorical information to more efficiently handle conflicts of categorical information (Crisp & Turner, 2011). This prediction is supported from various studies showing increased cognitive flexibility and divergent thinking in response to spontaneous (Cheng & Leung, 2013; Cheng et al., 2011; Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Leung & Chiu, 2010) as well as prolonged experiences of diversity (Leung & Chiu, 2010; Maddux et al., 2010; Maddux & Galinsky, 2009; Steffens et al., 2015; Tadmor, Galinsky, et al., 2012). Responses to diversity in the form of everyday experiences while living in socially diverse areas has been understudied. Previous studies on the response to prolonged experiences of diversity

have focussed either on experiences of diversity while living or travelling abroad (Godart et al., 2015; Hellmanzik, 2013; Maddux et al., 2010; Maddux & Galinsky, 2009) or on biculturals (Cheng et al., 2008; Saad et al., 2013). These studies are important to establish patterns of cognitive adaptation to diversity, but they neglect the form of diversity which will be experienced most frequently in socially diverse societies, namely everyday experiences of diversity for majority members living in a diverse environment. The current project therefore aimed to focus on the impact of diversity for majority members specifically.

One way to assess cognitive flexibility towards categorical information is to measure the need to apply categories to structure one's perception and to achieve quick closure. Individuals who score high on such needs as the need for cognitive closure (NFCC) or the personal need for structure will tend to apply rigid thinking and to show an unquestioned reliance on categorical information such as stereotypes (Hamtiaux & Houssemand, 2012; Kruglanski & Webster, 1996; Neuberg & Newsom, 1993). Members of the ethnic majority who had experienced a lot of diversity in the form of positive interethnic contact scored low on the NFCC as well as on the PNS scale in Studies 7a-8. These findings offer further support for the idea that diversity promote cognitive change through increased cognitive flexibility. It also extends previous findings by demonstrating that effects of diversity apply to majority members as well, suggesting that responding to diversity with the development of cognitive flexibility is a universal process.

8.5.2 Diversity and Conventionalism

The CPAG model emphasises that cognitive flexibility as a response to diversity should generalise to domains beyond intergroup interactions. This idea has been supported by previous studies which have shown the effect of diversity on creative performances (Cheng & Leung, 2013; Cheng et al., 2011; Gocłowska et al., 2012;

Gocłowska & Crisp, 2013; Leung & Chiu, 2010, 2010; Maddux et al., 2010; Maddux & Galinsky, 2009; Steffens et al., 2015; Tadmor, Galinsky, et al., 2012). A further domain affected by diversity are conventional values and beliefs as demonstrated by Studies 4-6. Participants in these studies who had experienced very frequent positive contact reported a strong preference for social autonomy over conformity (Study 4), a low reliance on rules and conventional values (Studies 5 and 6), and a low willingness to submit to authority (Study 6). Together these results suggest that participants who have experienced a lot of diversity prefer value sets and beliefs that do not rely on categorical rules and conventions. In this sense, these results fit with findings from Lu et al. (2017) showing that time spent abroad can promote a preference of relativistic over absolute values. However, results from Lu et al. (2017) show that travelling abroad can also increase the chance for immoral behaviour. The tendency to cheat was not measured in Studies 4-6 so it is unclear if experiences of diversity resulting from living in diverse areas can have the same effect. On the other hand, what seems to be consistent over these studies is that individuals who have experienced a lot of diversity show a pronounced resistance towards categorical and absolute beliefs and norms as well as a critical stance towards authorities that aim to enforce these rules. These tendencies can certainly be beneficial as they promote questioning unfair societal norms or standards (Duckitt & Sibley, 2009). These characteristics of individuals who have experienced a lot of diversity might also make them more likely to engage in collective action against institutional injustice (e.g. Duncan, 1999; Moghaddam & Vuksanovic, 1990; Saeri, Iyer, & Louis, 2015). However, scepticism towards categorical norms might also translate into immoral behaviour as demonstrated by Lu et al. (2017). This might be the case if the flexibility towards categorical thinking is not accompanied by mature moral development (Blasi, 2009; Kohlberg & Candee, 1984). The factors determining if the tendencies towards relativistic

and unconventional values among individuals who have experienced a lot of diversity translate into immoral behaviour have to be clarified by future research.

The findings discussed this far fit well with the CPAG model as it was originally conceived (Crisp & Turner, 2011) in the sense that cognitive adaptation to diversity is mainly achieved through increased cognitive flexibility, and that this flexibility can influence many domains beyond intergroup interactions. However, results from Studies 1-3 suggest that some assumptions about how this cognitive flexibility is achieved require modification.

8.5.3 Diversity and Self-Regulation

The CPAG model assumes that categorical inconsistencies evoked by diversity are handled by a) inhibiting the conflicting categorical content to then b) resolve the conflict through generative thought (Crisp & Turner, 2011). Prolonged experiences of diversity are assumed to promote cognitive flexibility mainly by increasing the ability for cognitive inhibition. This implies that individuals who have experienced a lot of diversity should be more likely to show superior cognitive control. However, results from Studies 1-3 revealed that exposure to diversity was not associated with stronger self-regulation. In fact, self-regulatory performance was even found to be weaker for participant who have experienced a lot of diversity when diversity was made salient. This suggests that for individuals with diversity experience, cognitive inhibition does not play a major role for inconsistency resolution. Hence, the increase in cognitive flexibility must be achieved without an increase in cognitive inhibition. This means that the underlying adaptation process that ultimately leads to increased cognitive flexibility as assumed by the CPAG model requires revision.

8.5.4 A Revised Adaptation Process to Diversity

A revised model for the adaptation process to diversity was offered in Chapter 5 in response to the findings from Studies 1-3. Diversity is still assumed to lead to increased cognitive flexibility, given the substantial evidence linking diversity and increased flexibility and divergence in thought. This increased flexibility, however, was suggested to be achieved not through superior cognitive inhibitory ability, but through the activation of a mindset favouring flexible non-categorical thinking with weak boundaries between categories. This mindset would be activated diversity is salient and would de-emphasize the need for inhibiting categorical knowledge, since the activation of this knowledge is decreased in the first place. Hence, the motivation to apply monitor categorical rules should be reduced. Individuals who have experienced a lot of diversity would thus acquire a more efficient strategy for dealing with categorical inconsistencies requiring only minimal cognitive inhibition compared to the default mode of processing categorical conflict. The ability to forego the activation of categorical knowledge might also be enabling greater cognitive complexity. Understanding and integrating ideas that originate from different categorical domains is likely to profit from the ability to ignore categorical boundaries.

The idea that diversity leads to a decrease in the use of categorical knowledge was supported by findings from Studies 7a-8. In these studies, participants with more frequent positive contact reported lower NFCC and PNS, implying a decreased use of categorical thinking after prolonged exposure to diversity. This decreased use of categorical rules seems to generalise to beliefs and values as well as participants who have experienced a lot of diversity showed a low reliance on rules, norms and authority. These studies thus offer some initial support for the idea that diversity fosters cognitive flexibility by a decreased use of categorical information.

However, not all elements of the revised theoretical framework received conclusive empirical support. Diversity was assumed to affect the use of categorical information only for situations in which diversity was salient. However, findings from all studies are inconclusive on whether salient diversity leads to a change in processing mode.

8.5.5 Adaptation to Diversity and The Role of Salient Diversity

Through Studies 1-3 experiences of diversity only had an impact on self-regulatory ability when diversity was made salient. These findings suggested that salient diversity leads to the activation of a mindset for participants who have experienced a lot of diversity. It was therefore hypothesised that other forms of cognitive change in response to prolonged experiences of diversity would also be part of this mindset and only be present when diversity is salient as well. However, while salient diversity clearly seems to moderate the effects of diversity experiences on self-regulation (Studies 1-3), subsequent results were less consistent on the role of the salience of diversity for moderating the effects of diversity on social norms and rules (Studies 4-6) and epistemic needs (Studies 7a-8). Salient diversity did moderate the effect of frequent positive contact on social conformity values in Study 4 as well as its effect on need for cognitive closure in Study 7. No evidence of moderation by salient diversity were obtained in Study 5 and 6 for the effects of frequent positive on rule independence, conventionalism, and submission to authority. Furthermore, no moderation by salient diversity was present for the effect of frequent positive contact on the need for cognitive closure in Study 7b and for its effect on need for structure in Study 8. In these four studies, experiences of diversity had the same effect on the dependent variables independent of condition.

Diversity salience thus failed to moderate the effect of diversity experiences on the dependent variables in four out of eight studies which directly tested for moderation²¹. Furthermore, meta-analyses revealed a moderating effect of salient diversity for the effect of diversity on self-regulation, but for the effect on conventionalism. For the effect of diversity on the need for clear structure, findings are inconclusive: Salient diversity did moderate the effect of the quality of positive contact on the need for clear structure, but it did not moderate the effect of frequent diversity.

It should be noted that the manipulation for salient diversity was probably relatively weak and unobtrusive, since it was achieved by merely changing the order of questions. It is thus possible that a stronger manipulation might be necessary to consistently observe a moderating effect of salient diversity. Nonetheless it remains an important observation that diversity is associated with a more flexible stance towards moral rules, values and categorical structures in general, which in some studies was present even when diversity was not salient. In other studies, making diversity salient was necessary to observe such effects. A possible explanation for these findings might be that experiences of diversity are linked to a reduced reliance on categorical information in general, but that this tendency is further magnified when diversity is salient. Since amplified effects are more likely to be detected, this would explain why only when diversity was salient positive contact was associated with weaker social conformity values and a low NFCC. Failure to detect moderation effects of salient diversity in other studies might be due to the manipulation of diversity salience not being strong enough. In this case, the effect of salient diversity would be in line with findings from other

²¹ Study 1 was a correlational Study without a control condition. In this study the salience of diversity was thus not manipulated and its moderating influence was not tested.

studies: Several studies have demonstrated that the beneficial effects of diversity on creativity can be either enabled or amplified by salient diversity (Cheng et al., 2008; Maddux et al., 2010; Maddux & Galinsky, 2009; Saad et al., 2013). In Studies 1-3 diversity only influenced self-regulatory performance under diversity and never under neutral conditions. This suggests that individuals who have experienced a lot of diversity do not differ in their self-regulatory ability from other people, but when diversity is salient they might switch to a mode of increased flexibility which temporarily diminishes their motivation to regulate strict categorical rules. However, it might still be possible that individuals who have experienced a lot of diversity tend to be slightly impaired in their self-regulation due to their different processing tendencies, but these differences were only picked up when their reliance towards categorical processing was further decreased when diversity was made salient.

Current results suggest that salient diversity moderates the impact of diversity experiences on different cognitive processes, but to a different degree. However, the current findings are inconclusive and invite further elaboration by future research.

8.6 Limitations

8.6.1 Manipulation Issues

As indicated above, the manipulation used in the current studies to make diversity salient might have been too weak to consistently show an effect. However, this issue is difficult to investigate without data on more varied manipulations of diversity salience. In the current studies, the manipulation of diversity salience was kept mostly consistent to keep findings comparable across studies. However, as the current results are inconclusive on the influence of salient diversity it will be important to investigate the influence of stronger ways to make diversity salient. Increasing the impact of the diversity salience manipulation carries the risk of experimenter bias if the purpose of the research

becomes too obvious so the challenge will be to find subtle but effective ways to make diversity salience. One way of doing so might be manipulating the ethnic diversity of the experimenter or instructing participants to first complete a seemingly unrelated study in which they must describe individuals with counter-stereotypical category combinations (Kunda et al., 1990).

8.6.2 Sampling Issues

The studies reported in the current investigation purposely sampled only White British participants to study the cognitive response to diversity for this group specifically. However, the sample was biased in a less desirable way as well as it used convenience samples recruited either at the University of Sheffield or through an online panel for academic studies (prolific.ac). Consequently, the sample is biased in the sense that it mostly represents relatively young and educated citizens. This way of sampling was chosen mostly because of its efficiency and accessibility. Furthermore, restricting the age group might be important when measuring the impact of early diversity. Experiences of diversity that occurred while participants were growing up are likely to be influenced by the zeitgeist and norms of the time so the early experiences of diversity of older participants might differ quite significantly.

However, diversity affects all members of society so it will be important for future research to study its effect using more varied sampling methods. Approaches to diversity might, for example, differ substantially across different age or educational levels, so including more diverse samples will be important to ensure that the cognitive response to diversity is comparable across different samples.

Furthermore, diversity affects countries outside of Western societies as well (Fearon, 2003), so understanding the cognitive response to diversity requires investigating cognitive responses to diversity outside Western societies. This is especially

true for cultures which tend to subscribe more to collectivistic values. Members of collectivistic cultures can differ in important ways in the way they make social judgements (e.g. Morris & Peng, 1994) so diversity might have a different impact on them.

8.6.3 Construct and Ecological Validity

Another issue that should be taken into consideration for the reported studies is their construct and ecological validity. The studies presented in this thesis contained measures that could be readily administered online or in the laboratory, but in some cases the ecological validity might have suffered. More specifically, Studies 1-4 relied on self-reports and the Stroop task as measures of self-regulation. While I believe that these measures are valid ways to assess self-regulatory strength, they represent a rather narrow operationalisation of self-regulation exclusively in terms of inhibition. While social psychology has sometimes viewed cognitive inhibition as mostly equivalent to self-regulation (e.g. Baumeister et al., 2006), researchers in cognitive psychology have emphasized that the relationship between these concepts is more complex and multifaceted (Hirsh & Kang, 2015). According to one influential framework (Miyake, Friedman, Emerson, Witzki, Howerter & Wager, 2000), there are three basic executive functions subserving self-regulation: These are updating, inhibition, and set shifting. While the results presented in this work suggest that inhibition does not benefit from diversity, it could lead to enhancements for other executive functions, such as set shifting. For example, biculturals are known to be proficient at switching between different cultural meaning systems (Tadmor & Tetlock, 2006; Hong, Morris, Chiu & Benet-Martínez, 2000). It has been speculated that this ability might generalise towards superior set shifting (Gołowska & Crisp, 2014). This issue is especially relevant because more complex and ecological relevant tasks of self-regulation are likely to rely on all three types of executive functions. Furthermore, some findings indicate that self-regulation

might be impaired by cognitive flexibility when the task requires a narrow focus on clear and specific rules (Kossowska et al., 2014; Kossowska, 2007a, 2007b). Cognitive flexibility can be an asset, however, when the self-regulatory task requires the integration of complex information or is performed under cognitive load (Kossowska, 2007a). It would therefore be interesting to explore the effect of diversity on more ecologically valid measures of self-regulation. Self-regulatory tasks relevant to everyday life might sometimes be more complex or involve more cognitive load than classic laboratory cognitive control tasks. Performance on these types of tasks might therefore not be affected or even benefit from diversity, due to the increased cognitive flexibility. A possible way to measure more ecological valid acts of self-regulation might be tracking a participant's success during attempts to attain a personal goal (e.g. to stop smoking, to follow a healthy diet, study goals, etc.).

Further measures in Studies 4-6 employed different questionnaires to assess the participants' reliance on conventional rules and values, as well as their tendency to approve of social conformity. However, values and beliefs might not always transfer to actual behaviour. For future studies it would be interesting to see if participants who have experienced a lot of diversity also differ in regard to their behaviour when it comes to promoting or following conventional rules and norms. Cheating would be one way in which a low reliance on rules can manifest, and there is indeed an increased tendency to cheat for participants who spent a lot of time abroad (Lu et al., 2017). However, experiences of diversity were also associated with a low willingness to give in to social conformity and a low reliance on conventional norms (Studies 4-6). This might also favour questioning social injustice and lead to collective action (Duckitt & Sibley, 2009).

8.6.4 Generalising to Other Types of Diversity

For this thesis, I have decided to focus on the impact of experiences with ethnic diversity. This had the benefit to increase the comparability of results across studies within this thesis, but also with a multitude of other studies on social diversity which have traditionally focussed on ethnic or cultural diversity. However, it must be pointed out that social diversity can take many different forms and that only studying one dimension of diversity is ultimately limiting the scope and applicability of the research. Social diversity can by definition be experienced along any dimension that is considered meaningful for categorising people into groups (Plaut, 2010b; van Knippenberg et al., 2004). As indicated in Chapter 2, Western societies are experiencing a diversification of social roles in domains beside ethnicity such as gender (Giele & Holst, 2003; Smits et al., 2003), age (Riley & Riley, 1994, 1989), sexuality (Cohler & Hammack, 2007), and occupations (R. H. Turner, 1990; Wroblewski & Huston, 1987). Social categories along these dimensions should in theory lead to similar categorical conflicts as ethnic diversity, and could therefore lead to cognitive change by the same mechanisms (Crisp & Turner, 2011). Although some research has begun to also study cognitive change for different forms of diversity (e.g. Di Bella & Crisp, 2016), more research is needed to demonstrate that the response pattern to social diversity is truly universal. Future research could therefore explore whether other types of diversity also affect self-regulation, the reliance on conventional rules or epistemic needs akin to ethnic diversity.

8.7 Avenues for Future Research

As discussed in the previous section, future studies should explore the role of salient diversity with different types of manipulations, and use broader sampling methods. Other important issues to be addressed by future research will be more ecological relevant measures and studies on other types of social diversity. In the following, I will also discuss

additional suggestions for future studies that might serve to expand the findings of this thesis.

8.7.1 Exploring Different Forms of Diversity

The findings presented in this thesis have demonstrated that diversity can lead to positive contact which in turn makes cognitive change more likely. However, not all forms of ethnic diversity might be equally likely to lead to positive interethnic contact. Even if positive contact occurs in an environment with some frequency it is not certain that it incites cognitive change. The CPAG model has emphasized that experiences of diversity must contain unexpected elements and therefore be challenging in order to motivate cognitive adaptation (Crisp & Turner, 2011). Future research could therefore explore the factors that make positive contact and challenging experiences of diversity more likely. A factor that seems likely to moderate the impact of ethnic diversity is the degree of ethnic segregation of an area. Even if a larger area (such as a district) is ethnically diverse, on a smaller scale (such as neighbourhoods) ethnic identities might be clearly separated. If a large majority of a neighbourhood identifies with the same ethnic category, opportunities for interethnic contact will be low. Furthermore, since interethnic exchange is low, minority members are likely to identify with only one ethnic identity so their identity will be less complex than that of biculturals (Roccas & Brewer, 2002; Tadmor et al., 2009). Encounters with minority members with low identity complexity are more likely to conform to common expectations, since the chance for surprising, cross-cutting identity combinations is low. So even if positive contact should occur in areas with segregated diversity, it is unlikely to promote cognitive change. Another factor that might have similar effects is the predominant preference of acculturation strategy among minority groups and among the host society (Berry, 1997; Brown, Zagefka, Zanna, & Olson, 2011).

8.7.2 Exploring Different Forms of Contact

In a similar vein, investigating the impact of different forms contact also represents an opportunity for future research. Study 5 has demonstrated that positive contact can lead to a low reliance on rules and subscribing to unconventional values, while negative contact can have the opposite effects to positive contact for some variables. Future studies could narrow in what types of positive contact are most likely to promote negative contact. For example, having friends with different ethnic backgrounds might be more impactful than frequent but superficial everyday interethnic encounters as interactions with friends might be experienced as highly relevant and therefore increase the motivation to process potential categorical conflicts. Future studies might thus also measure the different types of encounters that participants experienced. A more detailed way of exploring this issue could be field studies that report which conditions are more likely to promote deeper contact and measure how this moderates cognitive change.

8.7.3 Longitudinal Studies

According to the CPAG model, cognitive adaptation to diversity will only occur after chronic exposure to diversity (Crisp & Turner, 2011). Studies measuring the cognitive impact of diversity have either measured responses to spontaneous experiences of diversity in the laboratory (Cheng & Leung, 2013; Cheng et al., 2011; Gocłowska et al., 2012; Gocłowska & Crisp, 2013; Leung & Chiu, 2010), self-reports of prolonged experiences of diversity such as experiences abroad (Godart et al., 2015; Hellmanzik, 2013; Maddux et al., 2010; Maddux & Galinsky, 2009) or have sampled biculturals as a population with prolonged experience with diversity (Cheng et al., 2008; Saad et al., 2013).

However, true longitudinal studies on the cognitive effect of diversity over time are generally lacking. The studies in this thesis have employed self-reports of positive

contact during the past 6 months or while growing up as an indicator for prolonged experiences of diversity. Future research would benefit tremendously from longitudinal projects investigating how diversity would over time lead to cognitive change. A relatively cost-effective method of research would be to sample students at the beginning of their first semester who have relocated to their new university from areas with relatively low levels of ethnic diversity. Ideally, such a project would sample students from different universities with different levels of ethnic diversity. This would make it possible to measure the effects of different levels of prolonged exposure to diversity over time on various cognitive factors.

8.8 Practical Implications

This thesis has presented some findings that have practical relevance for various domains which are likely to be characterised by a high degree of ethnic diversity. Such a high level of diversity has become the norm for many businesses, universities, schools and other types of organisation (Barbosa & Cabral-Cardoso, 2007; Jayne & Dipboye, 2004). This thesis therefore offers new insights for businesses that want to tap the potential of ethnic diversity, but also want to avoid potential problems that might arise with it. Below I will make some suggestions on how the findings from this thesis could be incorporated in practice.

First, findings from Studies 1-3 suggest that salient diversity can lead to suboptimal self-regulatory performance for individuals who have experienced a lot of diversity. This implies that extra attention should be given when diverse workgroups have to work on tasks that require self-regulation with strict monitoring of specific simple rules. In such a case, it might be advisable to also avoid unnecessary reminders of diversity.

Secondly, ethnic diversity was also found to favour a low tendency towards categorical rules and structures (Studies 7a-8). This should make individuals who have

experienced a lot of diversity adept at tasks that require handling of unstructured and ambiguous information. Examples are creative projects or tasks that demand integrating complex information. Individuals with diversity experience and socially diverse workgroups should shine in such tasks, especially if the diversity is made salient.

Thirdly, the findings from Studies 4-6 show that diversity also promotes questioning conventional values and social conformity. This could imply that as societies are becoming more diverse, its members might be more inclined to question conventional norms and established authority. Hence, more socially diverse societies should be more likely to question social injustice and demand justification from institutionalised power.

8.9 Conclusion

This thesis aimed to contribute to research on the cognitive impact of prolonged experiences of diversity by exploring the mechanisms of cognitive change in response to prolonged exposure to ethnic diversity for members of the ethnic majority. This approach allowed testing of one of the more specific assumptions of the CPAG model, namely the idea that diversity should lead to the development of enhanced cognitive inhibition. This assumption was not supported by the empirical findings presented in this thesis. This suggests that the link between diversity and cognitive flexibility cannot be explained by improved self-regulation. However, further studies suggested that diversity can be linked to a low reliance on rules and categorical structures, which would fit well with the cognitive flexibility observed after exposure to diversity in other studies. These results thus offer evidence that the cognitive change in response to diversity occurs primarily by a decreased reliance on categorical information, rather than improved inhibition. Furthermore, this thesis demonstrated that the cognitive impact of diversity can also be studied among ethnic majority members, who experience diversity only through observing other social actors belonging to more complex combinations of social

categories. By exploring the cognitive response of ethnic majority members to everyday diversity, this thesis contributes to research on the cognitive impact of social diversity.

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APPENDIX A:

PAST SUBJECTIVE EXPOSURE TO ETHNIC DIVERSITY (ALL STUDIES)

Think of the time you spent in secondary school. Please try to estimate what percentage of students in your secondary school belonged to the ethnic groups listed below. If you have gone to several secondary schools, please think of the of the one you went to last.

(Your percentages must add up to 100%)

_____ White British

_____ White other than British

_____ Asian or Asian British

_____ Black or Black British

_____ Mixed or other

Think of the neighbourhood that you grew up in (i.e. spent most of your time before you turned 18). If you have experienced several neighbourhoods while growing up, please think of the area where you have spent the most time before you turned 18. Please try to estimate what percentage of the people living there belonged to the ethnic groups listed below.

(Your percentages must add up to 100%)

_____ White British

_____ White other than British

_____ Asian or Asian British

_____ Black or Black British

_____ Mixed or other

APPENDIX B:
RECENT EXPERIENCES OF DIVERSITY (PILOT STUDY)

The following statements refer to your experiences in the past year (particularly those involving other people). Read each statement and respond by choosing the option that best represents your agreement.

Thinking of my experiences in the past year, I would say that...

1. I enjoyed media and art from different cultures.

Strongly Disagree 1 2 3 4 5 Strongly Agree

2. Many of my friends come from different cultural-racial-ethnic backgrounds different than my own.

Strongly Disagree 1 2 3 4 5 Strongly Agree

3. The majority of my friends come from the same culture as I do.

Strongly Disagree 1 2 3 4 5 Strongly Agree

4. Many of my friends live or have lived abroad.

Strongly Disagree 1 2 3 4 5 Strongly Agree

5. With some of my friends I communicated in a language that is not my first.

Strongly Disagree 1 2 3 4 5 Strongly Agree

6. I have spent a lot time living in a country other than my home country.

Strongly Disagree 1 2 3 4 5 Strongly Agree

7. I had much exposure to different cultures.

Strongly Disagree 1 2 3 4 5 Strongly Agree

8. I acquired knowledge about a culture that is not my own.

Strongly Disagree 1 2 3 4 5 Strongly Agree

9. I met many people from different cultural backgrounds.

Strongly Disagree 1 2 3 4 5 Strongly Agree

10. Most people I met were from the same culture as I am.

Strongly Disagree 1 2 3 4 5 Strongly Agree

11. I met people with attitudes and values very different from mine.

Strongly Disagree 1 2 3 4 5 Strongly Agree

12. I had the opportunity to meet people outside my usual group of friends.

Strongly Disagree 1 2 3 4 5 Strongly Agree

13. Most of my social activities involved my usual group of friends.

Strongly Disagree 1 2 3 4 5 Strongly Agree

14. I regularly socialized with people from different cultures.

Strongly Disagree 1 2 3 4 5 Strongly Agree

15. Where I lived lots of different cultures came together and interacted with each other.

Strongly Disagree 1 2 3 4 5 Strongly Agree

16. Where I lived most people from other cultures were well integrated.

Strongly Disagree 1 2 3 4 5 Strongly Agree

17. Where I lived most people coming from different cultures mostly stayed to themselves.

Strongly Disagree 1 2 3 4 5 Strongly Agree

18. Where I lived most people did not have a lot of contact with people from other cultures.

Strongly Disagree 1 2 3 4 5 Strongly Agree

19. The people in my neighbourhood mostly had the same cultural background as me.

Strongly Disagree 1 2 3 4 5 Strongly Agree

20. I had to change some of my habits in order to adapt to the people around me.

Strongly Disagree 1 2 3 4 5 Strongly Agree

21. I experienced situations that were completely new for me.

Strongly Disagree 1 2 3 4 5 Strongly Agree

Note: Items 3, 10, 13, 17, 18 and 19 are reverse coded. Items were presented in random order.

APPENDIX C

CORRELATIONS ITEMS OF THE RECENT EXPERIENCES OF DIVERSITY SCALE MEASURED IN THE PILOT STUDY

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1	-																					
2	.33*	-																				
3	.47***	.65***	-																			
4	.25	.25	.35*	-																		
5	-.20	.04	.02	-.36**	-																	
6	.31*	.33*	.21	.30*	-.09	-																
7	.05	.16	.14	.09	.03	.08	-															
8	.29*	.60***	.50***	.42**	-.19	.22	-.09	-														
9	.09	-.35*	-.23	-.30*	.22	-.04	.07	-.39**	-													
10	.18	.47***	.31*	.04	.05	.22	-.12	.43**	-.31*	-												
11	.27	.60***	.56***	.08	.14	.32*	.15	.29*	-.15	.32*	-											
12	-.22	-.45**	-.37**	-.10	-.12	-.20	-.13	-.44**	.27	-.24	-.41**	-										
13	.29*	.71***	.58***	.36**	-.11	.29*	.26	.58***	-.22	.20	.48***	-.31*	-									
14	-.07	.03	.00	-.08	.07	-.07	.09	.05	-.23	-.13	-.01	.02	-.14	-								
15	.26	.15	.26	.24	-.21	.15	.16	.28*	-.04	.10	.18	-.05	.19	.02	-							
16	.32*	.32*	.34*	.17	.24	.17	.22	.02	.03	.16	.45***	-.12	.22	.03	.33*	-						
17	-.07	.00	-.26	.02	-.08	.22	-.11	.22	.01	.14	-.23	-.05	.04	-.20	-.23	-.51***	-					
18	-.23	-.28	-.43**	-.25	.21	-.12	.02	-.37**	.08	-.07	-.21	.10	-.36*	.08	-.67***	-.29*	.30*	-				
19	-.09	.06	.01	-.20	.10	-.12	-.07	-.06	.21	-.05	-.01	-.17	.11	.02	-.32*	-.19	.14	.22	-			
20	.11	.49***	.21	.07	-.02	.04	.16	.22	-.29*	.44**	.35*	-.27	.23	-.06	.18	.10	.07	-.12	-.22	-		
21	.20	.48***	.42**	.13	.25	.17	.24	.18	-.15	.36*	.57***	-.49***	.31*	-.03	.01	.15	-.02	.12	.21	.27	-	

Note: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

APPENDIX D:
BARRAT IMPULSIVENESS SCALE – BRIEF
(PILOT STUDY, STUDIES 1, 2 AND 4)

People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and chose the appropriate option. Do not spend too much time on any statement. Answer quickly and honestly

1. I plan tasks carefully

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

2. I do things without thinking

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

3. I do not 'pay attention'.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

4. I am self-controlled.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

5. I am a careful thinker.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

6. I say things without thinking.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

7. I act on the spur of the moment.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

8. I concentrate easily.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

Note: Items 1, 4, 5 and 8 are reverse coded. Items were presented in random order.

APPENDIX E:
COMPULSIVE BUYING SCALE
(PILOT STUDY)

Please indicate how much you agree or disagree with the statement below. Choose the option which best indicates how you feel about the statement.

1. If I have any money left before I receive my next income, I just have to spend it.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Please indicate how often you have done each of the following things by choosing the appropriate option.

2. Felt others would be horrified if they knew of my spending habits

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. Bought things even though I couldn't afford them.

- Never
- Rarely
- Sometimes
- Often
- Very Often

4. Wrote a check or used a credit card when I knew I didn't have enough money in the bank to cover the payment.

- Never
- Rarely
- Sometimes
- Often
- Very Often

5. Bought myself something in order to make myself feel better.

- Never
- Rarely
- Sometimes
- Often
- Very Often

6. Felt anxious or nervous on days I didn't go shopping.

- Never
- Rarely
- Sometimes
- Often
- Very Often

7. Used the overdraft of my account or made only the minimum payments on my credit cards.

- Never
- Rarely
- Sometimes
- Often
- Very Often

APPENDIX F:
SUBJECTIVE SOCIOECONOMIC STATUS SCALE
(ALL STUDIES EXCEPT FOR PILOT STUDY)

Think of this ladder as representing where people stand in society. At the top of the ladder are the people who are best off—those who have the most money, most education and the best jobs. At the bottom are the people who are worst off—who have the least money, least education and the worst jobs or no job. The higher up you are on this ladder, the closer you are to people at the very top and the lower you are, the closer you are to the bottom. Where would you put yourself on the ladder?



Choose the number whose position best represents where you would be on this ladder.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

APPENDIX G:

ACADEMIC DELAY OF GRATIFICATION SCALE (STUDIES 1-4)

We will now show you a series of choices between two alternative courses of action. Please read each set of statements carefully. Then tell which course of action you would be more likely to choose and the strength of that choice. There are no right or wrong answers. Please respond with your true beliefs rather than the way you think you should respond. That is, tell us what you really would do under the conditions described in the statements.

1.

A. Go to a favorite concert, play, or sporting events and studying less even though it may mean getting a lower grade on an exam the next day,

OR

B. Stay home and study to increase your chances of getting a higher grade.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

2.

A. Study a little every day for an exam and spend less time with your friends,

OR

B. Spend more time with your friends and cram just before the test.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

3.

A. Miss several classes to accept an invitation for a very interesting trip,

OR

B. Delay going on the trip until your courses are over.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

4.

A. Go to a party the night before a test and study only if you have time,

OR

B. Study first and party only if you have time.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

5

A. Spend most of your time studying just the interesting material for a course even though it may mean not doing so well,

OR

B. Study all the material that is assigned to increase your chances of doing well in the course

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

6.

A. Skip a class when the weather is nice and try to get the notes from somebody later,

OR

B. Attend class to make certain that you do not miss something even though the weather is nice outside.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

7.

A. Stay in the library to make certain that you finish an assignment that is due the next day,

OR

B. Leave to have fun with your friends and try to complete it when you get home later that night.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

8 A. Study for a course in a place with a lot of pleasant distractions,

OR

B. Study in a place where there are fewer distractions to increase the likelihood that you will learn the material.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

9.

A. Leave right after class to do something you like even though it means possibly not understanding that material for the exam,

OR

B. Stay after class to ask your instructor to clarify some material for an exam that you do not understand..

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

10

A. Select an elective with an instructor who is fun even though he/she does not do a good job covering the course material,

OR

B. Select an elective with an instructor who is not as much fun but who does a good job covering the course material.

- Definitely choose A
- Probably choose A
- Probably choose B
- Definitely choose B

Note: Items 2 and 7 are reverse coded. Items were presented in random order.

APPENDIX H:

FREQUENCY AND QUALITY OF POSITIVE CONTACT (STUDIES 3, 4, 6 AND
7A)

For the following questions, please think of the time you spent growing up in your hometown (area where you spent the most time before you turned 18), and your experiences with people from ethnic backgrounds different from your own during that time.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions?

	Never	Rarely	Sometimes	Often	Very Often
Satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grateful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For the following questions, please think of your experiences with people from ethnic backgrounds different from your own within the last 6 months.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions?

	Never	Rarely	Sometimes	Often	Very Often
Satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grateful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Note: Frequency of positive contact is measured by items 1 and 2. Quality of contact is measured by the items contained in question 3. Studies 3 and 4 only contained questions on the frequency of positive contact. Study 6 only used the first three items of question 3.

APPENDIX I:
CURRENT SUBJECTIVE EXPOSURE TO ETHNIC DIVERSITY
(STUDY 3 AND STUDIES 6-8)

Now think of your current university. Please try to estimate what percentage of students in your university belong to the ethnic groups listed below.

(Your percentages must add up to 100%)

- _____ White British
- _____ White other than British
- _____ Asian or Asian British
- _____ Black or Black British
- _____ Mixed or other

Think of the neighbourhood that you are living in now. Please try to estimate what percentage of the people living there belonged to the ethnic groups listed below.

(Your percentages must add up to 100%)

- _____ White British
- _____ White other than British
- _____ Asian or Asian British
- _____ Black or Black British
- _____ Mixed or other

APPENDIX J:

BARRAT IMPULSIVENESS SCALE (15 ITEM SHORT VERSION; STUDY 3)

People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. You will be presented with a couple of statements. Read each statement and chose the appropriate option. Do not spend too much time on any statement. Answer quickly and honestly.

1. I act on impulse.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

2. I act on the spur of the moment.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

3. I do things without thinking.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

4. I say things without thinking.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

5. I buy things on impulse

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

6. I plan for job security.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

7. I plan for the future.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

8. I save regularly.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

9. I plan tasks carefully.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

10. I am a careful thinker.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

11. I am restless at lectures or talks.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

12. I squirm at plays or lectures.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

13. I concentrate easily.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

14. I don't pay attention.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

15. I am easily bored solving thought problems.

- Rarely/Never
- Occasionally
- Often
- Almost Always/Always

Note: Motor impulsiveness is measured by items 1-5. Non-planning impulsiveness is measured by items 6-10 (all reverse coded). Attentional impulsiveness is measured by items 11-15 (item 13 is reverse coded). Items were presented in random order.

APPENDIX K:
MONETARY CHOICE QUESTIONNAIRE (STUDY 3)

People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. You will be presented with a couple of statements. Read each statement and chose the appropriate option. Do not spend too much time on any statement. Answer quickly and honestly.

1. Would you prefer: 54 GBP today, or 55 GBP in 117 days?
2. Would you prefer: 55 GBP today, or 75 GBP in 61 days?
3. Would you prefer: 19 GBP today, or 25 GBP in 53 days?
4. Would you prefer: 31 GBP today, or 85 GBP in 7 days?
5. Would you prefer: 14 GBP today, or 25 GBP in 19 days?
6. Would you prefer: 47 GBP today, or 50 GBP in 160 days?
7. Would you prefer: 15 GBP today, or 35 GBP in 13 days?
8. Would you prefer: 25 GBP today, or 60 GBP in 14 days?
9. Would you prefer: 78 GBP today, or 80 GBP in 162 days?
10. Would you prefer: 40 GBP today, or 55 GBP in 62 days?
11. Would you prefer: 11 GBP today, or 30 GBP in 7 days?
12. Would you prefer: 67 GBP today, or 75 GBP in 119 days?
13. Would you prefer: 34 GBP today, or 35 GBP in 186 days?
14. Would you prefer: 27 GBP today, or 50 GBP in 21 days?
15. Would you prefer: 69 GBP today, or 85 GBP in 91 days?
16. Would you prefer: 49 GBP today, or 60 GBP in 89 days?
17. Would you prefer: 80 GBP today, or 85 GBP in 157 days?

18. Would you prefer: 24 GBP today, or 35 GBP in 29 days?
19. Would you prefer: 33 GBP today, or 80 GBP in 14 days?
20. Would you prefer: 28 GBP today, or 30 GBP in 179 days?
21. Would you prefer: 34 GBP today, or 50 GBP in 30 days?
22. Would you prefer: 25 GBP today, or 30 GBP in 80 days?
23. Would you prefer: 41 GBP today, or 75 GBP in 20 days?
24. Would you prefer: 54 GBP today, or 60 GBP in 111 days?
25. Would you prefer: 54 GBP today, or 80 GBP in 30 days?
26. Would you prefer: 22 GBP today, or 25 GBP in 136 days?
27. Would you prefer: 20 GBP today, or 55 GBP in 7 days?

Note: Items were presented in random order.

APPENDIX L:

SOCIAL CONFORMITY/AUTONOMY SCALE (STUDY 4)

On the next few pages you will be given a series of choices between two alternative statements. Please read each set of statements carefully. Then tell which statement you would be more likely to agree with. There are no right or wrong answers. Please respond with your true beliefs rather than the way you think you should respond.

1.

A. It's best for everyone if people try to fit in instead of acting in unusual ways.

OR

B. People should be encouraged to express themselves in unique and possibly unusual ways.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

2.

A. Obeying the rules and fitting in are signs of a strong and healthy society.

OR

B. People who continually emphasize the need for unity will only limit creativity and hurt our society.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

3.

A. We should admire people who go their own way without worrying about what others think.

OR

B. People need to learn to fit in and get along with others.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

4.

A. It is most important to give people all the freedom they need to express themselves.

OR

B. Our society will break down if we allow people to do or say anything they want.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

5.

A. Society is always on the verge of disorder and lawlessness and only strict laws can prevent it. *OR*

B. It is more important to give people control over their lives than to create additional laws and regulations.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

6.

A. People can only develop their true potential in a fully permissive society.

OR

B. If we give people too much freedom there will just be more and more disorder in society.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

7.

A. Rules are there for people to follow, not to change.

OR

B. Society's basic rules were created by people and so can always be changed by people.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

8.

A. People should not try to understand how society works but just accept the way it is.

OR

B. People should constantly try to question why things are the way they are.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

9.

A. People should be guided more by their feelings and less by the rules.

OR

B. The only way to stay out of trouble is to respect the established rules of society.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

10.

A. People should be given the opportunity to hear all sides of a question, regardless of how controversial it is.

OR

B. If we cannot achieve agreement on our values we will never be able to keep this society together.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

11.

A. In the long run our cultural and ideological differences will make us a healthier, more creative, and stronger society.

OR

B. It is unlikely that this country will survive in the long run unless we can overcome our differences and disagreements.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

12.

A. Society should aim to protect citizens' right to live any way they choose.

OR

B. It is important to enforce the community's standards of right and wrong.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

13.

A. Students must be encouraged to question established authorities and criticize the customs and traditions of society.

OR

B. One of the major aims of education should be to give students a few simple rules of behavior to make them better citizens.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

14.

A. Young people sometimes get rebellious ideas but as they grow up they ought to get over them and settle down.

OR

B. If some people don't occasionally come up with rebellious ideas there would be less progress in the world.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

15.

A. It may well be that children who talk back to their parents respect them more in the long run. *OR*

B. Obedience and respect for authority are the most important virtues children should learn.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

16.

A. Children should be taught to do what is right even though they may not always feel like it. *OR*

B. Children should be encouraged to express themselves even though parents may not always like it.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

17.

A. The most important values children should learn are love and respect for their parents.

OR

B. The most important values children should learn are independence and self-reliance.

- Strongly Agree with A
- Agree with A
- Agree with B
- Strongly Agree with B

Note: Items 3, 4, 6, 9, 10, 11, 12, 13 and 15 are reverse coded. Items were presented in random order.

APPENDIX M:

POSITIVE AND NEGATIVE INTERETHNIC CONTACT SCALE (STUDY 5)

For the following questions, please think of the time you spent growing up in your hometown (area where you spent the most time before you turned 18). If you have changed location while growing up, please think of the area where you have spent the most time before you turned 18.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. How often did somebody pester you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

4. Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions?

	Never	Rarely	Sometimes	Often	Very Often
Satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Angry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For the following questions, please think of your experiences in the last 6 months.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. How often did somebody pester you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

4. Now think about your encounters with people from ethnic backgrounds different from your own. How often did you experience the following emotions?

	Never	Rarely	Sometimes	Often	Very Often
Satisfied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Angry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX N:
RULE INDEPENDENCE SCALE (STUDIES 5 AND 6)

We will now show you a couple of questions relating to a situation shown in a picture on the same page. There are no right or wrong answers. Please respond with your true feelings rather than the way you think you should respond.



1. If you were in the situation depicted in the picture, to what extent would you care about following the rules?

- Not at all
- A little bit
- Somewhat
- Quite a bit
- Very much



2. If you were in the situation depicted in the picture, to what extent would you care about following the rules?

- Not at all
- A little bit
- Somewhat
- Quite a bit
- Very much



3. If you were in the situation depicted in the picture, to what extent would you care about following the rules?

- Not at all
- A little bit
- Somewhat
- Quite a bit
- Very much

Note: All items are reverse coded. Items were presented in random order.

APPENDIX O:

RIGHT-WING AUTHORITARIANISM – CONVENTIONALISM (STUDY 5)

Please read each set of statements carefully. Then tell which statement you would be more likely to agree with. There are no right or wrong answers. Please respond with your true beliefs rather than the way you think you should respond.

1. Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

2. There is no ‘ONE right way’ to live life; everybody has to create their own way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. Gays and lesbians are just as healthy and moral as anybody else.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Note: All items are reverse coded. Items were presented in random order.

APPENDIX P:
RIGHT-WING AUTHORITARIANISM (STUDY 6)

Please read each set of statements carefully. Then tell which statement you would be more likely to agree with. There are no right or wrong answers. Please respond with your true beliefs rather than the way you think you should respond.

1. Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

2. There is no 'ONE right way' to live life; everybody has to create their own way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. There is nothing wrong with premarital sexual intercourse

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. Gays and lesbians are just as healthy and moral as anybody else.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. Obedience and respect for authority are the most important virtues children should learn.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. The real keys to the "good life" are obedience, discipline, and sticking to the straight and narrow.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. It may be considered old fashioned by some, but having a normal proper appearance is still the mark of a gentleman and, especially, a lady.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Note: Conventionalism is measured by items 1-4 (all reverse coded). Submission is measured by items 5-7. Items were presented in random order.

APPENDIX Q:

NEED FOR COGNITIVE CLOSURE (STUDIES 7A AND 7B)

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences.

1. I think that having clear rules and order at work is essential for success.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. Even after I've made up my mind about something, I am always eager to consider a different opinion.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. I don't like situations that are uncertain.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

4. I dislike questions which could be answered in many different ways.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

5. I like to have friends who are unpredictable.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

6. I find that a well ordered life with regular hours suits my temperament.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

7. I enjoy the uncertainty of going into a new situation without knowing what might happen.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

8. When dining out, I like to go to places where I have been before so that I know what to expect.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

9. I feel uncomfortable when I don't understand the reason why an event occurred in my life.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

10. I feel irritated when one person disagrees with what everyone else in a group believes.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

11. I hate to change my plans at the last minute.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

12. I would describe myself as indecisive.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

13. When I go shopping, I have difficulty deciding exactly what it is I want.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

14. When faced with a problem I usually see the one best solution very quickly

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

15. When I am confused about an important issue, I feel very upset.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

16. I tend to put off making important decisions until the last possible moment.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

17. I usually make important decisions quickly and confidently.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

18. I think it is fun to change my plans at the last moment.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

19. My personal space is usually messy and disorganised.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

20. In most social conflicts, I can easily see which side is right and which is wrong.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

21. I tend to struggle with most decisions.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

22. I believe orderliness and organization are among the most important characteristics of a

good student.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

23. When considering most conflict situations, I can usually see how both sides could be right.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

24. I don't like to be with people who are capable of unexpected actions.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

25. I prefer to socialize with familiar friends because I know what to expect from them.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

26. I think that I would learn best in a class that lacks clearly stated objectives and requirements.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

27. When thinking about a problem, I consider as many different opinions on the issue as possible.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

28. I don't like to go into a situation without knowing what I can expect from it.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

29. I like to know what people are thinking all the time.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

30. I dislike it when a person's statement could mean many different things.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

31. It's annoying to listen to someone who cannot seem to make up his or her mind.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

32. I find that establishing a consistent routine enables me to enjoy life more.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

33. I enjoy having a clear and structured mode of life.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

34. I prefer interacting with people whose opinions are very different from my own.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

35. I like to have a plan for everything and a place for everything.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

36. I feel uncomfortable when someone's meaning or intention is unclear to me.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

37. When trying to solve a problem I often see so many possible options that it's confusing.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

38. I always see many possible solutions to problems I face.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

39. I'd rather know bad news than stay in a state of uncertainty.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

40. I do not usually consult many different options before forming my own view.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

41. I dislike unpredictable situations.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

42. I dislike the routine aspects of my work (studies).

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Note: Items 2, 5, 7, 12, 13, 16, 18, 19, 21, 23, 26, 27, 34, 37, 38, and 42 are reverse scored.

Items were presented in random order.

APPENDIX R:

FREQUENCY AND QUALITY OF POSITIVE CONTACT – REVISED SCALE

(STUDIES 7B AND 8)

For the following questions, please think of the time you spent growing up in your hometown (area where you spent the most time before you turned 18). If you have changed location while growing up, please think of the area where you have spent the most time before you turned 18.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. How often did you have positive contact with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

4. When you met people from different ethnic backgrounds (while growing up in your hometown), in general did you find the contact...

	Not at all	Slightly	Moderately	Very	Extremely
...pleasant?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...cooperative?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...deep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...natural?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For the following questions, please think of your experiences in the last 6 months.

1. How often did somebody help you that was from an ethnic background different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

2. How often did you have interesting conversations with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

3. How often did you have positive contact with people from ethnic backgrounds different from your own?

- Never
- Rarely
- Sometimes
- Often
- Very Often

4. When you met people from different ethnic backgrounds (in the past 6 months), in general did you find the contact...

	Not at all	Slightly	Moderately	Very	Extremely
...pleasant?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...cooperative?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...deep?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...natural?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX S:

PERSONAL NEED FOR STRUCTURE SCALE (STUDY 8)

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences.

1. It upsets me to go into a situation without knowing what I can expect from it.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. I'm not bothered by things that interrupt my daily routine.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. I enjoy being spontaneous.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

4. I find that a well-ordered life with regular hours makes my life tedious.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

5. I find that a consistent routine enables me to enjoy life more.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

6. I enjoy having a clear and structured mode of life.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

7. I like to have a place for everything and everything in its place.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

8. I don't like situations that are uncertain.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

9. I hate to change my plans at the last minute.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

10. I hate to be with people who are unpredictable.

believes.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

11. I enjoy the exhilaration of being in unpredictable situations.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

12. I become uncomfortable when the rules in a situation are not clear.

Strongly Disagree 1 2 3 4 5 6 Strongly Agree

Note: Items 2, 3, 4, and 11 are reverse scored. Items were presented in random order.

