

The impact of inter-group conflict on stereotype threat or lift

Tamlyn Carmin Seunanden

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Supervisor- Mike Quayle

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## Abstract

Stereotype threat and lift occur when a negative or positive group stereotype results in a shift in task performance for group members. Social identity theory (SIT) explains that the socio-structural variables influence the group members' strategy to maintain a positive group identity and predicts that perceived intergroup conflict would interact with status to affect their experience of the stereotype and potentially impact on stereotype threat and lift on test performance. The experimental design manipulated the task-related group status of science students (assigning 122 students to high status, low status or control conditions) and their perceived intergroup conflict (high and low) with an out-group of humanities students whom they believed to be real but were actually simulated. The high and low status were manipulated using test instructions that activated the stereotype that the science group compared a humanities group *either* possessed an analytic cognitive ability that was required for test performance and post degree success (high status) or possessed an alternate flexible cognitive ability that was not required for post degree success (low status); whilst the status control condition excluded a diagnostic comparison of cognitive ability. The inter-group conflict and cooperation were experimentally manipulated by presenting hostile or cooperative feedback using intergroup matrices adapted from Tajfel (1981) in a computer simulated interaction with a virtual humanities out-group. The change in status (stereotype threat and lift) and conflict were measured using the Ravens Advanced Progressive matrices (APM) which was presented as the test of performance which measured post degree success. The APM was used as a dependent measure of the group level stereotype-related differences in performance for high conflict-threat, high conflict lift, high conflict control, low conflict threat, low conflict lift and low conflict control conditions. The results showed that status and conflict interact to impact on test performance outcomes of the science students. Specifically, the change in stereotype threat is reversed when science students receive cooperative feedback from the humanities out-group.

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## Declaration

I Tamlyn Carmin Seunanden declare that this dissertation is a product of my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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**Tamlyn Carmin Seunanden**

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**Date**

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**Dr Mike Quayle**

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**Date**

## Abridged Table of Contents

|  |     |
|--|-----|
| Chapter One: Introduction .....  | 1   |
| Chapter Two: Understanding stereotype threat theory .....                  | 4   |
| Chapter Three: Variables highlighted in stereotype threat literature ..... | 14  |
| Chapter Four: Incongruent changes in test performance .....                | 25  |
| Chapter Five: Conflict.....  | 29  |
| Chapter Six: Social Identity theory.....                                   | 33  |
| Chapter Seven: Methodology .....   | 44  |
| Chapter Eight: Results .....   | 63  |
| Chapter Nine: Discussion .....   | 74  |
| Chapter Ten: Conclusion .....  | 89  |
| References.....  | 92  |
| Appendices.....  | 102 |

## Table of Contents

### Chapter One: Introduction

|                                    |   |
|------------------------------------|---|
| 1.1 Stereotype Threat Theory ..... | 1 |
| 1.2 Social Identity theory .....   | 2 |
| 1.3 Intergroup Conflict .....      | 3 |

### Chapter Two: Understanding stereotype threat theory

|   |    |
|---|----|
| 2.1 Stereotype Threat Theory .....  | 4  |
| 2.2 Pre-conditions for stereotype threat and lift .....                               | 5  |
| 2.2.1 A social category or group membership. ....                                     | 5  |
| 2.2.2 An important domain of activity.....  | 6  |
| 2.2.3 A stereotype about group-members' abilities and performance in that domain..... | 7  |
| 2.3 Triggers of stereotype threat.....  | 8  |
| 2.4 Stereotype threat and decreased test performance .....                            | 10 |
| 2.5 Stereotype threat and academic test performance .....                             | 12 |

### Chapter Three: Variables highlighted in stereotype threat literature

|   |    |
|---|----|
| 3.1 Introduction .....  | 14 |
| 3.2 Disidentification and domain disengagement .....                        | 14 |
| 3.3 Reduced ability to learn.....   | 15 |
| 3.4 Affective and physiological effects .....                               | 16 |
| 3.5 Stereotype boost and lift, reactance and “choking under pressure” ..... | 17 |
| 3.6 Effort, interest and achievement motivation .....                       | 18 |
| 3.7 Self-efficacy and performance expectancies .....                        | 19 |
| 3.8 Features of the task.....   | 20 |
| 3.8.1 Test diagnosticity .....  | 20 |
| 3.8.2 Task difficulty and frustration .....                                 | 21 |

|   |    |
|---|----|
| 3.9 Features of the individual task-taker .....                             | 21 |
| 3.9.1 Cognitive ability.....  | 21 |
| 3.10 Identity.....  | 22 |
| 3.10.1 Stigma consciousness.....  | 22 |
| 3.10.2 Identification with the stereotyped group .....                      | 22 |
| 3.10.3 Domain Identification .....  | 23 |
| 3.11 Casual models for the stereotype threat performance relationship ..... | 24 |

Chapter Four: Incongruent changes in test performance

|  |    |
|--|----|
| 4.1 Introduction .....                               | 25 |
| 4.2 Test diagnosticity and stereotype relevance..... | 25 |
| 4.2 Domain identification.....                       | 26 |
| 4.3 Salience of identities.....                      | 26 |

Chapter Five: Conflict

|   |    |
|---|----|
| 5.1 Introduction .....  | 29 |
| 5.2 Perceived intergroup conflict and hostility .....           | 30 |
| 5.3 Gender differences in response to intergroup conflict ..... | 31 |

Chapter Six: Social Identity theory

|  |    |
|--|----|
| 6.1 Introduction .....   | 33 |
| 6.2 A brief history of social identity theory .....  | 33 |
| 6.3 Taking Social Identity Theory seriously in relation to stereotype threat and lift..... | 37 |
| 6.3 Stereotype threat, lift, and conflict .....  | 39 |
| 6.4 Stereotype threat and hostile stimuli .....  | 40 |
| 6.5 The role of perceived intergroup conflict in stereotype threat, lift contexts ..       | 41 |

Chapter Seven: Methodology

7.1 Introduction .....44

7.2 Research Design .....44

7.3 Hypothesis and expectations .....46

7.4 Sample .....46

7.5 Manipulations .....46

    7.5.1 Status manipulation and stereotype Activation..... 46

    7.5.2 High and low status condition..... 47

    7.5.3 Status control condition ..... 48

    7.5.4 Conflict manipulation ..... 49

7.6 Data analysis.....52

7.7 Measures .....52

    7.7.1 Pre-manipulation measure of performance: Shipley Institute of Living Scale..... 53

7. 8 Manipulation checks for status manipulations .....54

    7.8.1 Stereotype threat and lift manipulation check ..... 54

    7.8.2 Inter-group conflict manipulation check..... 54

    7.8.3 Dependent measure: Ravens Advanced Progressive Matrices ..... 54

    7.8.4 Social Identity Theory Inventory ..... 55

        7.8.4.1 *The stability subscale.* ..... 56

        7.8.4.2 *In-group homogeneity.* ..... 56

        7.8.4.3 *Previous academic history.* ..... 56

        7.8.4.4 *Demographic Information.* ..... 57

7.9 Procedure .....57

    7.9.1 The recruitment phase..... 57

    7.9.2 The testing phase..... 58

    7.9.3 The testing context..... 58

    7.9.4 The debriefing phase..... 59

7.10 Ethical considerations.....60



7.10.1 Stressful or upsetting procedures ..... 60  
7.10.2 Deception ..... 61

Chapter Eight: Results

8.1 Demographics .....63  
8.2 Scale Reliability Analysis.....64  
    8.2.1 Stereotype threat and lift manipulation check ..... 65  
    8.2.2 Conflict ..... 65  
    8.2.3 Conflict manipulation check ..... 65  
    8.2.4 Reliability of the Social Identity Inventory ..... 66  
    8.2.5 Reliability of the dependent measure: Raven’s Advanced Progressive Matrices..... 67  
8.3 Testing the change in status and conflict on APM performance .....67  
    8.3.1 The influence of social identity variables on the status by conflict interaction..... 69  
8.4 Testing the gender by status by conflict interaction–performance relationship  
.....71

Chapter Nine: Discussion

9.1 Summary of main findings .....74  
9.2 The conflict and status interaction.....75  
9.3 Incongruent increase in test performance for low conflict participants under  
threat .....75  
9.4 Incongruent decrease in test performance for participants in the low conflict  
lift condition .....77  
9.5 Studying stereotype threat in real world contexts .....78  
9.6 Toward a non-deterministic model of stereotype threat theory .....79  
9.7 Socio structural variables and conflict .....80  
9.8 Going back to social identity theory.....82  
9.9 Stereotype threat and lift, and gender.....84

|  |        |
|--|--------|
| 9.10 Limitations .....   | 86     |
| 9.10.1 Lack of a control for the conflict manipulation .....                                   | 86     |
| 9.10.2 Low reliabilities of scales .....   | 86     |
| 9.10.2.1. <i>Stereotype threat and lift manipulation check</i> .....                           | 86     |
| 9.10.2.2. <i>Conflict</i> .....  | 86     |
| 9.10.2.3. <i>Conflict manipulation check</i> .....   | 86     |
| 9.10.2.4. <i>Reliability of the Social Identity Inventory</i> .....                            | 87     |
| 9.10.2.5. <i>Reliability of the dependent measure: Raven’s Advanced Progressive Matrices..</i> | 87     |
| 9.10.3 Use of the SILS to test the change in status and conflict on APM performance .....      | 87     |
| <br>Chapter Ten: Conclusion .....  | <br>89 |
| <br>References .....   | <br>92 |
| <br>Appendices   |        |
| Appendix A: Informed Consent.....  | 102    |
| Appendix B: Status lift manipulation .....   | 103    |
| Appendix C: Status threat manipulation .....   | 104    |
| Appendix D: Status control manipulation .....  | 105    |
| Appendix E: Social Identity Inventory .....  | 106    |
| Appendix F: Debriefing Document .....  | 123    |
| Appendix G: Social Identity Inventory subscale reliability .....                               | 125    |
| Appendix H: Descriptive statistics of the Shipley Institute of Living Scale .....              | 126    |
| Appendix I: Descriptive statistics of the Raven’s Advanced Progressive Matrices<br>.....       | 127    |
| Appendix J: Means and standard deviation of status and conflict interaction .....              | 128    |
| Appendix K: Summary of Hierarchical Regression Analysis for stability .....                    | 129    |
| Appendix L: Summary of Hierarchical Regression Analysis for .....                              | 130    |

in-group homogeneity .....130  
Appendix M: Table of means for status-conflict interaction with sex .....131

## List of Tables

### Methodology

Table 7.1: Conflict and status group categories.....45

### Results

Table 8.1: Table of count for manipulations.....69

Table 8.2: Unstandardized regression weights for the stability regression model and the  
homogeneity regression model.....70

Table 8.3: Social Identity Variables that influence the Status by Conflict Interaction on APM  
performance  
.....71

## List of Figures

### Literature review

Figure 6.1: APM scores for each level of performance across status by conflict.....43

### Methodology

Figure 7.1: Example of Tajfel’s (1981) Matrices used in the conflict manipulation.....50

Figure 7.2: Feedback response for low conflict condition.....51

Figure 7.3: Feedback response for high conflict condition.....51

Figure 7.4: Diagram of the testing context.....59

### Results

Figure 8.1: Bar chart showing the difference that conflict has on APM test performance for stereotype threat, lift and control conditions.....66

Figure 8.2: Conflict and status interaction with APM scores.....69

Figure 8.3: Conflict and status interaction for males and females.....72

## Chapter One: Introduction

### 1.1 Stereotype Threat Theory

Stereotype threat theory seeks to explain why groups who are at risk of behaving in a way that would confirm a stereotype perform differently on a task. For example previous research has shown that the stereotype threat (ST) negatively impacts on the test scores of black students who experience a decrement in academic performance and positively affects the test scores of white and Asian students who experience an increment in test performance (Aronson, Lustina, Good, Keough & Steele, 1999). Stereotype threat or lift (STL) is a situational modifier of task performance that occurs when a negative or positive group stereotype becomes relevant to the performance of a stereotype-relevant task (Steele, 1997; Walton & Cohen, 2003). For example white men perform well when they are presented with a standardized test that measures their ability compared to the lower status Black group (SL) (Steele & Aronson 1995). White students perform poorly when confronted with the stereotype that Asians are better at mathematics (ST) (Aronson et al., 1999).

STL is a social phenomenon that partially explains how genuine inter-group differences in performance can be produced and perpetuated in society in the absence of any actual (e.g. biological, physical or cultural) differences between group members. Stereotype threat or lift can affect any individual who is a member of a relevant group that is stereotyped with respect to a task or task-relevant domain (Aronson & Good, 2001). ST has been shown to negatively affect a wide variety of groups in a wide variety of contexts, including white sports players, the aged, women in maths and science, affirmative action candidates and many others (see Walton & Cohen, 2003). The empirical effect of ST is now well established, although the causes, mediators and moderators are still unclear (Smith, 2004).

Steele (1997; 2010) has referred to stereotype threat as a predicament of *identity* in which a person's identity in a performance context and social features of that context combine to negatively impact on performance. Research on stereotype threat includes aspects of identity

such as domain identification, in-group identification and multiple identities have been explored in stereotype threat research. More recently, studies have revealed that the negative test performance can be counteracted by altering the salience of the targets' group identity. In addition researchers such as Derks, Inzlicht and Kang, (2008) explain stereotype threat as a situational predicament occurring when environmental cues make individuals fearful that they will be treated as a member of a social category that is devalued by others. However, despite these clear indications that stereotype threat is related to identity, the stereotype threat literature generally lacks a coherent definition or model of identity.

## **1.2 Social Identity theory**

Social identity theory (SIT) explains that in many social situations a person will behave as a member of a group to which they identify with (Abrams & Hogg, 1990; Turner, 1999). SIT acknowledges that behaviour of people exist an interpersonal-intergroup continuum (Tajfel, 1978 in Wetherell, 1996) and the potency of group membership in situations. The theory helps understand the circumstances under which people view themselves as a member of a group or as an individual and behave accordingly (Ellemers, Spears & Doosjje, 2002). This theory has been used to understand competitive intergroup behavior that leads to bias and discrimination which are common elements of stereotype threat that were present in the minimal group experiments (Tajfel & Turner, 1970 cited in Wetherell, 1996 which illustrated that people use coping strategies to manage their identity and maintain a positive self concept. In addition to the impact of social groups on behavior, the model shows that the perceptions that people have of other individuals and groups is understood in the social context in which it occurs (Ellemers et al., 2002). As such socio-structural variables such as the permeability of group boundaries, the stability of group statuses and legitimacy of status relations determine if people define themselves as group members (Ellemers et al., 2002; 1993). These features of the social structure also influence how people perceive their intergroup relations and make intergroup evaluations and group categorizations.

The realistic group experiments conducted by Sherif and Sherif (1969) addressed how realistic competition for scarce resources and hostile negative intergroup behavior resulted in

intergroup bias, discrimination, stereotyping (Wetherell, 1996). Categorization, and the possibility of prejudice leads to self-stereotyping, intergroup bias and discrimination (Abrams & Hogg, 1990; Wetherell, 1996; Spears et al., 1997), which were later identified by Steele (1997; 1995; 2002) as possible triggers of stereotype threat. Specifically, applying SIT insights to STL suggests that increased perceived conflict between groups (including competition for scarce resources) will increase category awareness; increases ingroup and out-group depersonalization; and modify how much people identify with the in-group and out-group (Tajfel & Turner, 1979); and therefore may impact on the nature and strength of STL on performance.

Haslam and colleagues (2008) have recently argued that social identity theory may be a very useful framework for explaining and understanding stereotype threat. They highlighted the active role of individuals who use active strategies to challenge stereotypes in order to maintain a positive identity and that the personal and structural features identified by SIT may be important factors. However, to date no studies have been published exploring the utility of any SIT variables except in-group identification for understanding and modeling differences in STL..

### **1.3 Intergroup Conflict**

In the majority of studies stereotype threat has been shown to *reduce* the performance of female students in a math test when the negative stereotype that women are inferior at math is activated (Nyugen & Ryan, 2008). However, Oswald and Harvey (2000) found that women's math performance can *increase* when a hostile stimulus is activated. This study hinted at the importance of conflict or negative stimuli in the testing context of the "target." A study was conducted by Seunanden (2008) which examined if changes to the conflict in one's environment could result in changes to the way in which a negative or positive stereotype is perceived. The results indicated that there is no overall difference in test performance in the cooperative and conflictual stimuli, but that conflict impacts the performance of high and low performers differently. The present study further experimentally investigates the impact of inter-group conflict on stereotype threat on test performance.



## Chapter Two: Understanding stereotype threat theory

### 2.1 Stereotype Threat Theory

“Stereotype threat (ST) refers to being at risk of confirming, as self-characteristic, a negative stereotype about one's group” (Steele & Aronson, 1995, p.797). According to (Altermatt & Kim, 2004) stereotype threat occurs in individuals that are likely to be perceived as inferior when they are conscious of society's stereotypes about the group to which they belong and feel pressured not to confirm the negative stereotype. This pressure interferes with task performance, which confirms the negative stereotype. An individual experiences stereotype threat (ST) when they are in a situation that places them at risk of confirming a negative stereotype about their group (Steele & Aronson, 1995). ST can affect any individual who is a member of a group, as long as they are aware that their social identity is relevant to the task on which their performance will be judged and a negative stereotype confirmed (Steele, Spencer & Aronson, 2002), for example the test scores of female math students (Spencer, Steele, & Quinn, 1999).

Group members experience enhanced performance in response to a positive stereotype (or favorable intergroup comparison) called stereotype boost (SB) or stereotype lift (SL) (eg Steele & Aronson, 1995; Smith & Johnson, 2006). Stereotype boost is an increase in performance when a positive in-group stereotype is made salient and has been observed for Asians in mathematics (Shih, Ambady, Richeson, Fujita, & Gray, 2002), the elderly in cognitive performance mathematics (Levy, 1996) amongst others. Stereotype lift occurs when a negative out-group stereotype provides a favourable out-group comparison and the out-group members experience an increase in test performance (Walton & Cohen, 2003). Stereotype lift can be further explained as when an individual is made aware of negative stereotype that the out-group such, “women are poor at math”, implies that the “non-stereotyped” group men are better at math and improves male performance on academic tests (Smith & Johnson, 2006; Walton & Cohen, 2003). By comparing themselves with a socially devalued group, individuals' that belong to high-status groups may experience increased self-efficacy or self-worth and reduced self-doubt,

anxiety, and fear of rejection that is associated with an increase in performance (Walton & Cohen, 2003).

Despite the evidence that an increase in performance occurs when a positive stereotype is made salient, research in the field has overwhelmingly focused its investigations on unidirectional (negative) effects on performance. To date, there are an inadequate number of publications that have investigated stereotype threat and boost in the same experiment (cf. Haslam, Salvatore, Kessler & Reicher, 2008). An advanced search on Google Scholar for the phrase “stereotype threat” exclusive of the words “boost” and “lift” showed 7.480 hits (November, 28, 2011) indicating that most studies have referred to stereotype lift/boost and stereotype threat as separate phenomena and studied them independently (eg. Blascovich, Spencer et al, 2001; Quinn & Spencer, 2001). However SL and ST are likely to occur concurrently in real-world settings (Haslam, et al, 2008). This study investigates ST and SL collectively by manipulating the valence of the stereotype and treating ST and SL as interdependent phenomena belonging to the same process of events to result in a change in performance. Stereotype threat or lift (STL) is defined as a situational modifier of task performance that occurs when a negative or positive group stereotype becomes relevant to the performance of a stereotype-relevant task (Steele, 1997; Walton & Cohen, 2003)

## **2.2 Pre-conditions for stereotype threat and lift**

In order for STL to occur there must be the following minimum requirements: firstly a social category or group membership (Steele, 1997), secondly an important domain of activity (Steele, 1997; Smith & White, 2001; Smith, 2004; Walton & Cohen, 2001) and thirdly a stereotype about group-members’ abilities and performance in that domain (Steele et al., 2002).

### **2.2.1 A social category or group membership.**

STL can affect any individual who is a member of a relevant group that is stereotyped with respect to a task or task-relevant domain (Steele, 1997). For example blacks in the race category for which the stereotype “blacks perform poorly on math tests compared to whites” is made salient. For stereotype threat to occur the individual needs to be a member of the group to which a generally known stereotype exists (Steele, 2002); for example females who perform

poorly compared to males on a math test. Social groups are generally hierarchical and the status of groups dependent on the social structure of the situation. Every person is a member of a social group about which negative stereotypes exists (Spencer, et al., 1999) making stereotype threat a pervasive element of groups. STL has been shown to affect individuals who belong to various groups, namely; elderly (Levy, 1996), Asians (Shih, et al., 2002), white (Aronson et al., 1999), men (Aronson et al., 1999), women (Spencer, Steele & Quinn, 1999; Quinn & Spencer, 2001; Yeung & von Hippel, 2008 ), elderly (Hausdorff, Levy, & Wei, 1999; Kang & Chasteen, 2009; Levy, 1996; Neuville & Croizet, 2007) the young (Ambady, Shih, Kim & Pittinsky, 2001), students from low socioeconomic backgrounds (Croizet & Claire, 1998), Blacks (Steele & Aronson, 1995) and athletes (Stone, Lynch, Sjomeling, Darley, 1999).

Individuals may belong to either group in a social category, for example black or white, female or male, or they may have memberships in multiple social categories such as a Christian, male, black. This indicates that an individual belonging to two or more groups enabling a group member to experience both stereotype threat and lift in different social situations (Aronson, Lustina, Good, Keough, & Steele, 1999). For example Caucasian men experience a decline in test performance when a stereotype about Asian math ability is made salient and an enhanced performance when a stereotype about women's math ability is made salient (Aronson et al., 1999).

### **2.2.2 An important domain of activity.**

In order for STL to occur, the group members must complete a task related to the domain to which the stereotype applies, and if the task is a diagnostic measure of performance then the effect is more likely. The domain relevant task must be related to a defining feature of the individual's identity. According to Steele (2003) anyone is liable to undergo STL as long as the construct is something which the person cared about to the extent that it was detrimental to their self-definition. For targets to experience a decline in performance they need not believe or endorse a stereotype or think it is individually relevant, but they need to identify with the domain such that they care about succeeding and are motivated to dispel any stereotypes of group performance in that domain (Smith and White, 2001; Steele et al., 2002; Steele 1997; Steele & Aronson, 2001; Steele et al, 2002; Smith 2004). For example, sixth grade girls that identify with

the math domain experience ST (Steele, 1997; Smith & White, 2001). Steele, James & Barnett (2002b) highlight women who view science as an important to their identity of developing a career in science experience stereotype threat in the in that domain.

Stereotype threat has shown to affect groups in academic domains such as SAT test (Brown & Pinel, 2003; Steele, 1997), GRE tests (Steele, 1997; Stricker & Bejar, 1999) and math tests as highlighted by Spencer, Steele and Quinn (1999) and Steele & Aronson(1995). In addition performance of individuals in a number of non-academic domains are affected by stereotype threat; for example white men in sports (Stone et al., 1999) women in negotiation (Kray, Reb, Galinsky, & Thompson, 2002) homosexual men in providing childcare (Bosson, Haymovitz, & Pinel, 2004) and women in driving (Yeung & von Hippel, 2008).

For STL to occur, the task needs to be made relevant to the stereotype (Aronson et al, 1999; Blascovitch et al, 2001; Steele et al, 2002). Spencer, Steele and Quinn(1999) found that when a test was not characterised as showing gender differences, the negatively stereotyped women with the same level of skill as men, performed equal to the men (out-group) on a difficult math test. Thus the performance of the stereotyped matched that of the non-stereotyped, as the negative stereotype was not made relevant to task performance (Spencer, Steele, & Quinn, 1999; Steele et al., 2002). Consequently, by presenting a task as diagnostic of a domain to which a stereotype exists, an individual can experience stereotype threat.

### **2.2.3 A stereotype about group-members' abilities and performance in that domain.**

Stereotypes are widespread beliefs about social groups that function to cognitively categorize people in order to make sense of the world (Jost & Banaji, 1994). Stereotypes are ubiquitous in society which and leads to expectations of the behaviour of an individual who belongs to the social group. For example Asians are better than Caucasians in math (Aronson, et al., 1999) or males are better at science or math domain whilst females are better at English and reading domains (Quinn and Spencer, 2001). Stereotypes illustrate an individual's ability and performance in a domain. There exist an array of stereotypes that differ in content; women have inferior negotiation skills (Kray, Reb, Galinsky, & Thompson, 2002), the elderly have poor memory compared to the young (Spencer, et al., 1999). Stereotypes about social groups are not

necessarily accurate or true (Katz & Braly, 1933 cited in Stangor, 2000). Meta-stereotypes are a person's beliefs regarding the stereotype that out-group members have about his or her own group (Vorauer, Main, & O'Connell, 1998). In which case, the individual who has a negative meta-stereotype may have a low self-image from their belief of negative perceptions by the out-group members.

In order for a person to experience stereotype threat or lift, the negative or positive stereotype has to be activated (Steele, 1997). Stereotypes are activated in many ways and are made relevant to the group membership of the target who experiences the underperformance associated with stereotype threat. Stereotypes are sensitive to situational cues that are evaluative or diagnostic and can be readily activated (Rydell, McConnell & Beilock, 2009). Stereotype threat can be activated by making the negative social identity salient by altering the testing procedure (Stricker & Ward, 2004) and interactions with the out-group (Marx & Goff, 2005), the presence of a minority status (Murphy, Steele, & Gross, 2007), situations in which group ability is evaluated (Kray, Thompson, & Galinsky, 2001), the presence of an instructor who is inequitable (Adams, Garcia, Purdie-Vaughns, & Steele, 2006) and situations in which group differences are highlighted (Aronson, et al., 1999; Spencer, et al., 1999; Yeung & von Hippel, 2008).

### **2.3 Triggers of stereotype threat**

Previous studies have been successful in creating an experimental context which stereotype threat occurs (Steele, 1997; Steele & Aronson, 1995; Steele et al., 2002). The underperformance associated with stereotype threat occurs in contexts in which there is an active stereotype, evaluative scrutiny of the targets abilities and salient group identity. These terms will be discussed below.

There are two types of contextual stimuli that activate ST: implicit or subtle activation of ST occurs when a target is placed in a situation within a domain where the negative stereotype is well known and can be activated without direct reference to the stereotype; and explicit activation of stereotype threat refers to situations in which the target is confronted directly and blatantly with the negative stereotype (Kray et al., 2004). An explicit manipulation of a

stereotype can be accomplished by using descriptions, testing materials, reports, or test instructions that reinforce a common stereotype about a group performance differences compared to another group or by directly telling participants about a negative stereotype about their group. (eg. Hoyt & Blascovich, 2010; Leyens, Desert, Croizet, & Darcis, 2000; Pronin, Steele, & Ross, 2004)

Research has shown that the presence of categories is often sufficient for a stereotype to become relevant (Bourhis, Sachdev, & Gagnon, 1994). Stereotype threat can be implicitly activated when targets are not overtly confronted with stereotypes instead made aware of stereotypes in normal everyday conditions (Smith and White, 2002). For example people associate feminine and masculine stereotypic traits with the categories men and women, respectively (Rudman, Greenwald, & McGhee, 2001). Implicit triggers include primes such as derogatory films (Oswald & Harvey, 2000; Steele & Aronson, 1995), television adverts (Davies, Spencer, Quinn & Gerhardstein, 2002), measuring of minorities represented in the performance context (Inzlicht & BenZeev, 2003; Murphy, et al., 2007; Purdie-Vaughns, Steele, Davies, Ditlmann, Crosby, 2008; Thompson & Sekaquaptewa 2003) requiring participants to indicate their sex or race prior to completing the performance measure (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010; Nguyen, O'Neal. & Ryan, 2003; Steele & Aronson, 1995), words on a computer screen (Greenwald, McGhee & Schwarz, 1998) and manipulating the category membership of the experimenter (Davis & Silver, 2003; Stone & McWhinnie, 2008). There has been much debate with regard to which type of trigger results in a decreased task performance; in their meta-analysis Nguyen & Ryan (2008) highlight that there is some evidence that targets may be motivated to prove the stereotype wrong and perform better on tasks when the trigger is explicit.

Tasks that increase the evaluative scrutiny can trigger stereotype threat; by testing the limitations of an individual's abilities on a difficult math test rather than an easy math test (Spencer et al., 1999 Experiment 2, or a test that is presented as a valid and reliable measurement of ability such that the individual believes that his or her ability in domain will be evaluated can create a strong sense of group identity and stereotype threat (Kray, et al., 2001; Marx, Stapel, & Muller, 2005). The evaluative nature of difficult and diagnostic tests may increase intergroup

comparison and force the target to become increasingly concerned about the implications of possible failure for interpretations of their own or their group's abilities (Steele, 1997; Steele & Aronson, 1995; Steele et al., 2002; Wout, Danso, Jackson, & Spencer, 2008; Wout, Jackson, & Sellers, 2009). Evaluative scrutiny and race salience as possible mediators of stereotype threat (Good, Aronson, & Inzlicht, 2003), and will be further highlighted in the section on task difficulty below.

Group identity can be made salient by the group identity composition in a room and the presence or expectation of their minority group (Inzlicht & Ben-Zeev, 2000; Murphy, et al., 2007; Sekaquaptewa, Waldman, & Thompson, 2007), the presence of an individual that belongs to a high status group (Marx & Goff, 2005; Stone & McWhinnie, 2008) and when participants are asked to report their race or other group identities prior to attempting a test (Shih, Pittinsky, & Ambady, 1999; Steele & Aronson, 1995). Therefore group identity salience is endemic to high stakes testing environments such as Advanced Placement and SAT examinations for example women who complete a math test have to indicate their gender before attempting the test and female students take the test in the presence of male students (Good, et al., 2003). Research on identities and stereotype threat suggest that the ways in which identities are made relevant in a context can influence the outcomes on test performance (Rydell et al., 2009; Shih, Bonam, Sanchez, & Peck, 2007; Shih, et al., 1999). This will be further discussed in the section that addresses blurring identities and multiple identities in the section on salience of the stereotyped identity in chapter 4.

## **2.4 Stereotype threat and decreased test performance**

The underperformance associated with ST has been empirically well established in over 300 studies examining test performance deficits (Davies, Spencer, & Steele, 2005) and as previously highlighted, across a large variety of groups in the academic test domain, including: women (Levy, 1996; Spencer, et al., 1999), Caucasians (Shih et al., 2002), black students (Steele & Aronson, 1995; Steele et al., 2002). Stereotype threat was described as a situational pressure that contributes to the black-white achievement gap on tests that measure cognitive ability (Steele, 1997; Steele & Aronson, 1995; Steele et al., 2002). Later, stereotype threat was found to

partially explain achievement gaps on standardized tests such as the GRE (Steele & Aronson, 1995), the SAT (Brown & Pinel, 2003; Steele, 1997) undertaken by students in college placement testing contexts. The performance gap could not be explained by individual factors such as low expectations and self-esteem or the lack of skill, cultural knowledge or motivation (Steele, 2010).

In the 1990's stereotype threat was found in black and white students on verbal tests (Steele & Aronson, 1995) and in male and female students on a math tests (Quinn & Spencer, 2001). This study was conducted on students enrolled at the Stanford University in which both racial groups completed a difficult verbal test that was presented as a diagnostic measure of ability or non-diagnostic of ability (Steele & Aronson, 1995). The performance of both racial groups was comparable on the test that was presented as non-diagnostic of ability (Steele & Aronson, 1995). However the white students outperformed the black students on the test that was presented as a diagnostic measure of ability (Steele & Aronson, 1995).

Stereotype threat research was conducted to determine if differences in performance outcomes exist between male and female who attempt a difficult mathematical word problem test which was presented as stereotypical of gender (high stereotype threat) or gender fair (reduced stereotype threat) by altering instructions on the test (Quinn & Spencer, 2001). The male and female students from the University of Michigan completed the test in a condition in which a stereotype about male superiority was made salient (high stereotype threat condition) and a condition in which the stereotype was directly negated with the instruction "men and women perform equally well on these problems" (ibid.). Men outperformed women in the high stereotype threat condition but women performed slightly higher than men in the reduced stereotype threat condition (ibid.).

Inclusive of the academic domains, the decrease in performance (underperformance associated with stereotype threat) was found in a number of experiments that were conducted in a range of settings; universities (eg. Aronson, et al., 1999; Steele & Aronson, 1995; Steele, et al., 2002), athletics (eg. Stone et al., 1999); classrooms (eg. Cole, Matheson, & Anisman, 2007; Good et al., 2003; Keller, 2007; Neuville & Croizet, 2007), the workplace (e.g. Bergeron, Block, & Echtenkamp, 2006) and real world contexts (eg. Steele, James & Barnett, 2002). Although the



underperformance has been empirically well, established researchers have not determined the process underlying the stereotype performance relationship (Smith, 2004). Although there are factors such as anxiety, cognitive ability, effort, motivation and self-efficacy have been implicated as causes of stereotype there have been difficulty in understanding how they affect ST. This will be further highlighted in Chapter 3.

## **2.5 Stereotype threat and academic test performance**

Assessment tools such as the Advanced Placement examinations, GRE, SAT and other measurements of IQ are used in high stakes testing environment standardized test scores that are used to determine the academic futures, college credit, scholarships in universities and the progression of learners in the education system in schools (Good, et al., 2003). These test reveal achievement gaps between minority and majority group members, such Hispanics compared to Whites (O'Toole, 2011) for learners. Stereotype threat literature emphasizes that individuals in the low status group for which a negative stereotype is made salient and are stigmatized are likely to perform poorly on these tests such the poor, women and blacks (Steele & Aronson, 1995, Spencer, Steele & Quinn, 1999; Quinn & Spencer, 2001). The black white achievement gap is evident in national educational statistics centers in America (O'Toole, 2011) and South Africa (Ministry of Education, 2001). However the link between stereotype threat and underperformance is not fully understood. Studies have revealed that there are numerous mediators, moderators, causes and triggers (further highlighted in chapter 3) that are involved in the stereotype- performance process.

The negative impact of stereotype threat on student test performance is evident in the across many groups in the United States (O'Toole, 2011; Ministry of Education, 2001) however very few South African studies have been undertaken in this area. As such the effect of stereotype threat on the test performance achievement gap is not fully understood in South African students. This study aims to replicate STL in a South African educational context. To further understand STL in the South African context this study shall determine if there are differences in the underperformance associated with stereotype threat and to understand how stereotype threat theory is experienced the applicability of identity related aspects and the identity related framework of Social Identity Theory will be investigated (Chapter 5). Inter-

group conflict a parameter of the Social Identity Theory, a macro level identity variable will be manipulated in attempts to learn if and how socio-structural variables influence changes in test performance associated with stereotype threat and lift (Chapter 4).

## **Chapter Three: Variables highlighted in stereotype threat literature**

### **3.1 Introduction**

There has been much confusion about the variables that might be associated with stereotype threat in the literature. Many variables associated with STL have been considered in multiple roles, and how each variable contributes to the decrease in test performance associated with stereotype threat is not well understood. For example the variable “test diagnosticity,” has been considered both as a moderator and as a trigger in the stereotype threat performance relationship (Steele, 1997; Steele & Aronson, 1999).

Investigations on the role of some variables associated with stereotype threat have contradictory affects on test performance (Aronson et al., 1999; Mayer & Hanges, 2003; Spencer et al., 1999) and variables such as domain identification have both mediates the STL performance relationship and increases the “targets” susceptibility to stereotype threat (Keller, 2007; Steele, 1997) . Traditionally, variables that do not result in decrease in test performance (such as ability) are used in future experiments as boundary conditions used to select participants, groups, tasks and situations to most likely to invoke ST in the experimental context. Conscious of this complexity, the following section will provide a general account of the key variables as described in stereotype threat literature.

### **3.2 Disidentification and domain disengagement**

Disidentification occurs when the individual copes with long term threat by avoiding the domain or detaching one’s identity from a domain (Steele et al. 2002). Domain disidentification occurs when a target is threatened by a negative stereotype and distance themselves from the activities typically associated with their group. Disidentification is a strategy used to protect self-esteem and identity from the threat of doing poorly in the domain but maintaining identification with the negatively stereotyped group (Steele, 1997). For example Steele and Aronson (1995) showed that African-Americans who experienced stereotype threat performed less well than their White counterparts and also expressed weaker preferences for stereotypically African-American activities such as jazz, hip-hop, and basketball. In other words, in response to

stereotype threat group members might distance themselves from their negatively stereotyped group identity in a domain (Steele et al., 2002). The self-view of targets thereby becomes dissociated with their performance on a task and allows them to maintain positive self-views.

Research has shown that threatening stereotypes can alter one's mainstream identity by redirecting one's focus on maintaining an identity in a new domain. Stereotypes can affect career choices early in schooling, as stereotype threat has been shown to undermine sense of belonging for girls in math as early as middle school (Good, Dweck, & Rattan, 2008); individuals that belong to a low status group, such as these women may experience enough discomfort to lead them to drop out of the domain and redefine their professional identities (Davies, et al., 2005; Griffin, 2002). Conversely high-achieving Blacks who do *not* disidentify from academics are more likely to face peer-group ostracism compared with high-achieving White students (Fryer, 2006; Zirkel, 2004). When individuals are threatened by a negative stereotype they may also chose to distance themselves from that social identity that may be indicative of the negative stereotype in order to preserve their sense of competence in that domain of performance (Pronin, Steele, & Ross, 2004; Cohen & Garcia, 2005).

### **3.3 Reduced ability to learn**

Studies demonstrate that female math students have a poorer memory and prevent ability to learn under conditions of ST independent of reductions in test performance (Rydell, Rydell, & Boucher, 2010; Rydell, Shiffrin, Boucher, Van Loo, & Rydell, 2010). In addition studies highlight that a reduced attempt at learning is apparent in students under situations of ST. That this might be mediated by depleted working memory (Rydell, Shiffrin, et al., 2010; Schmader, 2010; Schmader & Johns, 2003) and emotion (Mangels, Good, Whiteman, Maniscalco, & Dweck, 2011). However others have highlighted that the cognitive-depletion and learning-interference models cannot account for reduction in performance in physical tasks such as golf (Stone, et al., 1999) or how the STL sometimes results in increases in performance (Haslam, et al., 2008).

### 3.4 Affective and physiological effects

When a group member is at risk of being negatively stereotyped he or she could experience increased anxiety which may result in a decrease in performance on a task (Steele, 2002; Steele & Aronson, 1995). Studies indicate that a reduction in performance was due to narrowed attention, anxiety and self-consciousness (Osborne, 2001; Osborne, 2006). Other studies have also shown that individuals with high levels of anxiety score on achievement tests as opposed to individuals who have low levels of anxiety (Clawson, Firment & Trower, 1981 in Osborne, 2001). Smith's (2004) meta-analysis provides evidence that the reliability of these studies is questionable since low sample sizes and self-report measures of anxiety result in a low level of significance in the studies. However research conducted with representative samples and with physiological measures of anxiety show that high level of anxiety and arousal and targets of stereotype threat experience increased blood pressure, cardiovascular reactivity, skin conductance and temperature (Blascovich, Spencer, Quinn, & Steele, 2001; Osborne, 2006; Osborne, 2007; Ben-Zeev, Fein and Inzlicht, 2005). However these studies fail to show the relationship between anxiety and performance.

Most of the studies conducted in stereotype threat has focused on anxiety. However emotional states have been investigated in some of these studies. For example Davis and Stephan (2011) found that students who experienced threat to their identity as Americans displayed greater anger. Smith's (2004) meta-analysis indicated there was no evidence that depression, amongst other variables was a mediator of stereotype threat. However Keller and Dauenheimer's (2003) that explored agitation and dejection concluded that emotions of dejection mediate stereotype threat. The effect of emotions of stereotype threat has been under-explored and findings of the aforementioned studies are inconclusive.

Stricker and colleagues (1999) suggests that participants had higher motivation in applied settings in which the task was important to the participant such that it affected their self-esteem and points out that participants in Steele and Aronson's (1999) study reacted to stereotype threat by lowering motivation and psychologically withdrawing by answering the questions on the diagnostic test more slowly. Harder (1999) in Bailey (2004) showed that that females who highly identified with mathematics reported higher levels of motivation in the threat condition

but no significant performance differences. Studies support that participants experience an increased motivation when placed in the stereotype threat condition (Steele & Aronson, 1995; Aronson et al., 1999).

### **3.5 Stereotype boost and lift, reactance and “choking under pressure”**

ST has sometimes been associated with in ironic performance effects. In addition to the increased test performance associated with a salient positive stereotype as reflected in studies on stereotype boost and stereotype lift have showed that changes in test performance that are incongruent to the valence of the stereotype occur.

As previously highlighted in Chapter 2 stereotype boost is an increase in performance when a positive ingroup stereotype is made salient. This effect has been found in many studies (Armenta, 2010; Aronson et al., 1999; Shih et al., 2002; Smith & Johnson, 2006) and among many social categories, for example women in gender (Shih, et al., 2002) , Asians in race (Levy, 1996), and the elderly in age (Shih, et al., 2002; Hausdorff, Levy & Wei, 1999) and Asians (Aronson et al., 1999).

As previously highlighted stereotype lift occurs in members for which a negative stereotype is not made salient. These individuals can be described as members of a group with a superior status for which a positive stereotype exist; for example men for which an ubiquitous stereotype about high math performance exists. However when made aware of negative stereotype that the out-group such as, “women are poor at math”, the implication is that the “non-stereotyped” group— men are better at math (Smith & Johnson, 2006; Walton & Cohen, 2003). By comparing themselves with a socially devalued group these group members as may experience increased self-efficacy or self-worth and reduced self-doubt, anxiety, and fear of rejection and increase their test performance (Walton & Cohen, 2003).

Reactance occurs when a group member has the tendency to behave in a manner inconsistent with a stereotype which spurs increased performance (Kray, et al., 2001). The study conducted by Kray et al. (2001) found that stereotype reactance occurred when the negative gender stereotype was explicitly activated and women reacted against this proclamation and

outperformed men. On the other hand men typically outperformed women when a negative stereotype was implicitly made salient (Kray, et al., 2001).

Kray, Reb, Galinsky and Thompson, (2002) argued that the explicit activation of the gender stereotype was perceived as a limit to the female negotiator's freedom and ability to perform. Research on stereotype reactance asserts that when a perceiver's attention is blatantly invoked the link between a stereotype and a social category is drawn, which may result in behaviors that are inconsistent with the stereotype (Dijksterhuis et al., 1998; Martin, 1986; Strack, Schwarz, Bless, Kuebler, & Waenke, 1993 cited in (Kray, et al., 2004). Kray, Reb, Galinsky, & Thompson, (2004) contend that the linkage between stereotype activation and performance depends on the manner in which stereotypes are activated and determines whether participants adjust their performance in line with the negative valence of the stereotype or perform in contrast to the negative stereotype.

Choking under pressure is defined as the ironic decrease in performance under circumstances where good or improved performance is particularly important (Baumeister, 1984; Smith & Johnson, 2006). Situational manipulations of pressure such as implicit competition, a cash incentive, and audience-induced pressure increases conscious attention to the performer's own process of performance increases anxiety (Cheryan & Bodenhausen, 2000; Smith & Johnson, 2006). Other researchers further explain that disruptions in regulatory focus decrease test performance (Keller & Bless, 2007; 2008).

### **3.6 Effort, interest and achievement motivation**

Smith, (2004) discusses that excess effort or reduced effort may result in a decrease in test performance of negatively stereotyped group members. An individual may invest too little effort and behave in accordance to learned helplessness performing poorly on a task. On the other hand, studies undertaken by Aronson, and colleagues (1999) found that targets indicated *increased* effort on self report measures and performed *poorly* on a test. Further research conducted show that effort measured by the number of items attempted does not mediate performance (Shih et al., 1999, study 1, Steele & Aronson, 1995, study 1, study 2 cited in Smith, 2004). Still other researchers have found that reduced (Steele & Aronson, 1995) or increased

(Nussbaum & Steele, 2007) effort is a consequence of stereotype threat. Together with Smith (2004), these researchers failed to find a mediating relationship between effort and performance and failed to clarify if effort is a mediator and (or) a consequence of stereotype threat.

A study conducted by Smith, Sansone and White (2007) showed that women who completed an aptitude assessment test and were high in achievement motivation were more likely to spontaneously produce performance-avoidance related thoughts when subjected to stereotype threat than were individuals low in achievement motivation and in the control condition. This study indicated that women with the desire to achieve show more interest in conditions of stereotype threat, which affects their performance on the test. There are two types of goal striving tendencies, namely learning goals and performance goals (Elliott & Dweck, 1988).. Individuals with a learning goal orientation compare their current level of achievement to their past achievement and have an avoidance of failure. (Elliott & Dweck, 1988; Atkinson, 1957 cited in Maehr & Sjogren, 1971). Individuals with performance orientations compare their own levels of achievement to that of their peers (Elliott & Dweck, 1988). Bailey (2004), suggests that individuals with a goal orientation may be more concerned with improving their skill than performing at a given standard that they may be less vulnerable to threat and experience lower levels of anxiety and less of a reduction in self-efficacy than individuals with performance goal orientations (Margolis et al. 2000 in Bailey, 2004).

### **3.7 Self-efficacy and performance expectancies**

Research shows that females with a low self-confidence had a higher attrition from the math program as opposed to females with a higher self-confidence suggesting a difference in whether the females interpret the information in the environment as threatening or non-threatening (Thompson & Sekaquaptewa, 2003). However studies to date do not reveal that differences in perception of the environment is explicitly associated with varying levels of self-efficacy (Spencer et al., 1999; Stone et al., 1999). Instead studies indicate that changes in self-esteem and self-efficacy are a consequence or the effect of stereotype threat (Cohen & Garcia, 2005; Oakes, Haslam, & Turner, 1994). However the targets that have previously experienced stereotype threat may develop too much of motivation and perform poorly on a test (Keller,



2007) in which case motivation should be considered a moderator rather than an effect of stereotype threat if the target undergoes chronic stereotype threat (Rydell, Rydell, et al., 2010).

Steele (2002) suggests that stereotypes affect participant's performance expectations by lowering them in stereotype threat conditions and either raising them or not lowering them in conditions which remove the threat. A study conducted by Stangor, Carr, and Klang (1998) showed that stereotype threat can undermine positive expectations but it is not clear that lowering stereotype threat can increase expectations. A study conducted by Spencer et al, (1999) showed that the stereotype threat manipulation did not affect women's performance expectancies and that their performance expectancies did not relate to their actual performance. There is no consistent evidence that performance expectancies mediate changes in performance associated with stereotype threat. .

### **3.8 Features of the task**

#### **3.8.1 Test diagnosticity**

A number of studies have used diagnostic tests to manipulate stereotype threat (Aronson & Salinas, 1997; Abrams & Hogg, 1990; Steele & Aronson, 1995). Diagnostic tests are measurements that are presented to capture the cognitive ability of the stereotyped group member; a task for which a negative stereotype exist and the target has the opportunity to disconfirm a negative stereotype about that ability (Steele & Aronson, 1995). Diagnostic tests are tasks which are perceived by the target as evaluative and comparative between the abilities of the in-group and out-group member (Aronson, et al., 1999); for example math tests which test math ability of men and women (Aronson, et al., 1999; Quinn & Spencer, 2001; Spencer, et al., 1999). Changes in performance can emerge when intellectual tests are characterized as diagnostic of ability; this was also found in a study undertaken in Steele and Aronson, (1995) with white and black students who completed a non-diagnostic test, control test and a diagnostic test (Steele, et al., 2002) found that the act of sitting down in a testing environment to take a test portrayed as diagnostic of their intellectual ability was sufficient to activate the relevant task-related group stereotype. In other words by merely presenting a test as diagnostic of a task relevant ability can be sufficient to invoke ST.

### **3.8.2 Task difficulty and frustration**

Studies have shown that negatively stereotyped group members underperform in relation to the out-group when cognitive ability tests are difficult (Spencer, et al., 1999). Studies conducted by Spencer, Iserman, Davies and Quinn (2001) cited in (Steele, et al., 2002) as well as (Goethals, 2003) have shown that the cognitive load undertaken during a difficult task could result in underperformance of the negatively stereotyped group. Spencer and colleagues (1999) found that men and women's performance on a math test was equivalent when the test was relatively easy, but men outperformed women when the test was difficult. (Neuville & Croizet, 2007) study on third-grade girls showed that women performed more poorly on difficult items after their gender had been highlighted, but performed equally to men when the test contained easy items.

## **3.9 Features of the individual task-taker**

### **3.9.1 Cognitive ability**

Croizet, Després, Gauzins, Huguet, Leyens, and Méot (2004) found that a disruptive mental load results in decreased test performance. Steele and his colleagues (1997; 2010; 2002) found that ST is localised to a specific group of people — the academic “vanguard” — that are the most talented students that are performing at the edge of their ability at all levels of skill and confidence are more likely to experience stereotype threat (Steele, 1997, 2010; Steele, et al., 2002). He describes the academic vanguard of students in a domain, who identified most with the domain and are most motivated to perform well are who are most at risk for allowing stereotype threat to undermine their performance (Steele, 1997). Although studies indicate that high domain identified individuals compared to low domain individuals perform poorly when negative stereotype is made salient (Keller, 2007; Steele & Aronson, 1995), none of the studies include a pre-existing measure cognitive ability. Instead of a pre-existing measurement of cognitive ability the academic vanguard of students in these experiments was obtained by assessing how identified the target is to the domain

### **3.10 Identity**

Stereotype threat theory discusses the following identity related variables which highlights how aspects of the “targets” self in relation to the social aspects (objects, people etc) influence their performance in situations in which a threatening stereotype is made salient.

#### **3.10.1 Stigma consciousness**

Stigma consciousness is the chronic self-consciousness of one’s stigmatized status (Branscombe, Ellemers, Doosjie, 1999). Studies suggest that individuals who have been discriminated are more conscious of the stigma that exists and their performance in the measured task domain suffers. Brown & Pinel, (2003), adjacent to Steele and colleagues (2002) argument reason that stigma consciousness amplifies the stereotype threat, found that participants high in stigma consciousness performed worse than non-stigma-conscious persons under stereotype threat conditions but not in control conditions. Alternatively, studies found that increased stigma consciousness was associated with increased performance and that the contextual and individual factors influence the change in performance associated with stereotype threat (Ellemers et al., 2002; Spears et al., 1997; Mendoza-Denton, Shaw-Taylor, Chen and Chang, (2009).

#### **3.10.2 Identification with the stereotyped group**

Group identification may moderate the changes in stereotype threat on women’s performance (Schmader, 2002). Congruent with Steele and colleagues (2002) argument that increased identification with a group, increases the expectation to be perceived as a member of that group, resulting in more situations of stereotype threat, Schmader (2002) found that women performed more poorly on a math test when both their personal and gender identities were linked to the test as compared to when only their personal identity was linked to the test. . Thus for those women whose gender was an important part of their identity under high stereotype threat conditions would perform poorly on a difficult math test (Steele, et al., 2002). Schmader (2002) contends that women with lower gender identification feel less pressure from stereotype threat because they may not feel that gender stereotypes (good or bad) are as applicable to them and perform just as well as men on the difficult math test. An experiment conducted on older adults found that participants that were strongly identified performed poorly on a test to recall of a prose passage under stereotype threatening conditions (Kang & Chasteen, 2009).

As previously highlighted disidentification from the negatively stereotyped group occurs to protect identity within the valued domain (Spencer, et al., 1999). Steele and Aronson (1995) reasoned, this identity distancing reflected a desire not to be seen through the lens of a racial stereotype. Pronin and colleagues (2004) highlight that group members that are threatened by a negative stereotype may also choose to emphasize an unthreatened identity over a threatened one. This process is called identity bifurcation and may result in physically and psychologically distancing from in-group members who might confirm a stereotype (Cohen & Garcia, 2005).

### **3.10.3 Domain Identification**

The people who are more likely to be affected by stereotype threat are those who identify strongly with a particular domain (Steele, 1997). “Identification with a domain, as defined by Steel (1997), entails perceiving the domain (e.g. math) as attractive, important, feasible and perhaps most important, having favourable outcomes” (Smith & White, 2001, p.1042). Studies conducted suggest that a decrease in test performance associated with stereotype threat occurs only or most strongly among the members of the out-group most invested in the intellectual domain that was tested (Cohen, Steele & Ross, 1999; Steele, 2002).

Smith & White, (2001) maintain that the more a person is invested in a domain, the more likely that there could be stereotype threat. Domain identification is a relatively stable trait as it requires a large long term investment made in that domain Steele et al, (2002) however domain identification can be created in a situation by making the task personally relevant to the individual such that they care about performance in the domain (Steele, 1997). This is coherent with the understanding that all individuals including those that do not have identification with the domain that is being tested have the capacity to experience ST (Aronson, Fried & Good, 2002).

### **3.11 Casual models for the stereotype threat performance relationship**

The stereotype threat ideology has alluded to a definition on the negative impact that stereotype threat has on performance but does not provide a universal model of the stereotype-under-performance relationship. Research was conducted to determine which of the aforementioned variables mediators of the stereotype threat performance relationship. Soon researchers began using these variables to build causal pathways to understand the how the cognitive state referred to as stereotype threat caused a shift in performance. However single mediator models fail to depict how the pathway that result in the decline in performance and these pathways have not shown repeatability in studies (Smith, 2004). Models of the stereotype threat performance relationship illustrate that many mediators, moderators and individual difference have been shown to combine to result in underperformance (Schmader, Johns, & Forbes, 2008). Still other more intricate models tried to illustrate that the underperformance may be the result of many interrelated processes or models (Shapiro and Neuberg, 2007). However, to date no causal models have been consistently validated across domains and groups in the literature.

## **Chapter Four: Incongruent changes in test performance**

### **4.1 Introduction**

This chapter illustrates changes to the nature of the stereotype, the task, the domain and the “target’s identity with the group and domain may result in shifts in test performance incongruent to the stereotype threat performance model. This chapter cites research in stereotype threat in which the underperformance effect in the stereotype threat performance model is counteracted or reversed.

### **4.2 Test diagnosticity and stereotype relevance**

Studies indicate that by presenting a test as non-diagnostic (eg. as a set of puzzles) instead of diagnostic test of cognitive ability such as Tests of IQ such as SAT; Raven’s Advanced Progressive Matrices, the ST-related underperformance of negatively stereotyped group members disappears and performance may even increase (Brown & Day, 2006; Johnson, 2010). However negating the evaluative, diagnostic nature of a test is unrealistic in regular course examinations or in standardized math testing situations but by simply addressing the fairness of the test while retaining its diagnostic nature can alleviate stereotype threat in any testing situation (Good, Aronson & Harder, 2008).

Steele and Aronson (1995) found that by making the task irrelevant to the stereotype and explicitly producing perceptions of test-fairness and equal ability among groups the ST-related under-performance on the test could be prevented. This can be done by explicitly presenting the diagnostic math test as a non-measure of differences between men and women (Steele & Aronson, 1995) and fair (e.g., Quinn & Spencer, 2001; Spencer, Steele, and Quinn, 1999). Steele (1995) used test instructions let women know that although a stereotype about their low test performance compared to men exists is not true for this particular standardized math test. Once the gender fairness of the test was explicitly confirmed, the women taking the test were relieved of the pressure of confirming a negative stereotype, did not feel stigmatised and performed at the same level as equally skilled men. By changing perceptions of test-fairness the identity contingency of gender was ameliorated the ST effect was neutralized.

#### **4.2 Domain identification**

A study conducted by Aronson et. al., (1999) attempted to directly measure the performance of moderate and low identified math in sectors of white male math students by introducing a negative stereotype on Asian math superiority. In a testing environment the participants in the threat condition received an additional description which highlighted the test as diagnostic of Asian math superiority whilst in the control condition the participants received a description of the test as measuring ability of students. Aronson et. al., (1999) found that high math identified perform significantly worse after receiving the negative stereotype whilst moderately identified math performers performed significantly better after receiving the negative stereotype.

Converse to the “high domain identified participants” Aronson et al. (1999) found that the negative stereotype challenged students that were moderately identified with the math domain to *increase* their performance on the math test. A logical explanation is that the self esteem of the students in this sector, was not as bound up with the self esteem of the group and they did not have as much self-worth to lose as the high domain identified sector of students. It can also be hypothesized that this sector was not invested in the domain and not motivated to perform well and performing and their lowest potential may have not considered the stereotype relevant to their performance. These hypotheses have not been investigated by Aronson and colleagues (1999).

#### **4.3 Salience of identities**

As previously highlighted Aronson and colleagues (1999) found that white men who were aware of their negative identity in comparison to the Asian men underperformed as opposed to white men who were not made aware of this identity. In addition a study conducted by Shih, Pittinsky & Ambady (1999) found that Asian women who were aware of their identity as Asians performed better than women primarily. Gresky, Eyck, Lord and McIntyre’s (2005), study showed that found that stereotype threat effects can be reduced in high domain identifiers by invoking complex multiple identities regardless of their valence of the salient stereotype. (cf. McConnell & Brown, 2010; Niemann et al., 1998). As such invoking alternate identities for

which there may be positive stereotypes (such as Asians are better in math than Caucasians) may improve test performance in conditions in which a negative stereotype is made salient.

A study conducted by Ambady, Paik, Steele and Owen-Smith (2004) found that female undergraduates that completed a computer task with gender related words on the screen (stereotype activation), thereafter asked to list their individual unique qualities performed better on a difficult math test compared to females that were activated by a negative stereotype and listed qualities unrelated to themselves. This suggests that by making the participants solo status salient the participant's group identity becomes less accessible and relevant to the stereotype. This highlights the social identity approach which acknowledges that social behaviour is understood in an individual or interpersonal and intergroup continuum. As such this can be articulated process opposite to the interpersonal continuum and to depersonalization which is described by Steele (1997; 2010) as the loss of self identity. Instead it can be understood as identity disidentification of the salient group as previously described.

Reducing the salience of a threatened identity appears to serve a protective function, supporting continued high performance for those individuals already identify with the domain in question. As such blurring intergroup boundaries by encouraging individuals to think of characteristics that are shared by in-group and out-group members, particularly characteristics in the threatened domain (Rosenthal, Crisp, & Suen, 2007), also appears to preclude the development of stereotype threat in conditions that normally produce it (Rosenthal & Crisp, 2006). Rosenthal and colleagues (2006; 2007) found that women who were asked to complete a category-overlap task requiring them to think of commonalities between men and women performed significantly better on a math test than both women that were not given a task and women asked to think of differences between gender prior to the test. Therefore ST-related underperformance might be reduced by blurring intergroup boundaries, activating a positive super-ordinate identity.

Studies indicate that underperformance can be attenuated if alternate social identity of the target that is not linked to underperformance is made salient; this was indicated in a study conducted by Aronson (1999) and colleagues who found that white men were able to answer



more items on a mathematics test when no mention of a stereotype was made than when mention of the stereotype that Asian students outperform Caucasian students on the test. McGlone and Aronson (2006) required students to complete three different questionnaires that contained items that made reference to their gender identity, college identity or their citizen identity resulted in differences in test performance for males and females. Differences in gender and test performance were apparent and test performance differences were dependent on the type of salient identity; test performance was greater for females when their college identity was made salient and greater for males when their citizen identity was made salient. More recent studies indicate that under conditions of ST students with biracial identities are more likely to believe that race is socially constructed and perform well on a test as opposed to students with a monoracial identity (Shih, et al., 2007). Thus the effect of activating a group identity other than the group identity that has been activated with respect to a domain has shown to improve test performance and suggests that features that affect the social identity of the “target” may be useful in negating the stereotype threat underperformance effect.

The aforementioned research provides evidence that a congruent underperformance effect does not occur in every situation in which a negative stereotype is made salient. Instead the reverse pattern of performance is apparent and participants may perform better on a test when a negative stereotype is made salient. Although incongruent stereotype performance effects are apparent the stereotype threat model has been used to predict underperformance using the negative valence of the stereotype. Future experiments, researchers specifically sought out a decline in the test performance of a stigmatized group member to illustrate that stereotype occurred. Research began to shift away from investigating possible interventions to improve test performance and prevent the stereotype threat performance effect from occurring to determine the causal ingredient and the pathway underlying the process of ST, as a result numerous studies that followed in stereotype threat literature, replicated the stereotype threat underperformance effect (Davies et al., 2005).

## Chapter Five: Conflict

### 5.1 Introduction

Stereotyping and prejudice have a number of social consequences in the world including health disparities, genocide and terrorism (Sternberg, 2003). Prejudice is expressed in blatant and subtle maltreatment of others in which people express hostile behaviour to members of social groups that they do not identify with. These hostile actions in which bombing a home of a racial couple, distributing racist literature, taunting blacks on the streets, sexually harassing women, vandalizing Muslim prayer rooms, attacks to patrons at gay bars, Asian men beating African American college students (Kenrick, Neuberg, & Cialdini, 2009; Sternberg, 2003). Prejudice and discrimination is widespread; for example Jews and Arabs in the middle east struggle over land, Lebanese youth riot and attack one another in Australia, in Saudi Arabia women are not allowed to drive cars and are prohibited by men from holding leadership positions, and conflict between religion and ethnicity is apparent between the Jews and Arabs in the Middle East (Kenrick, et al., 2009). In South Africa we have witnessed hostile behaviour such as the prevention of freedom for black people Apartheid Era (Bennett, 1998; Smith, 1992). Hostile environments which contain negative stereotypes prejudice and feelings and beliefs that lead to discriminatory behaviour have been a common element of society (Kenrick, et al., 2009; Sternberg, 2003).

Intergroup conflict and hostile environments are also common to a host of everyday social intergroup contexts for example soccer games and math tests. Early studies on intergroup behaviour in the experiments conducted by Sherif and Sherif in 1969 and Tajfel and Turner in 1970 indicate how categorization and social comparison led to intergroup discrimination and prejudice, stereotyping and with the out-group (Wetherell, 1996). Stereotype threat is triggered by a number of factors; group categorisation and bias and discrimination (Steele, 1997; Steele & Aronson, 1995). Since conflict has been shown to increase category salience, and perceptions of intergroup differentiation and outgroup homogeneity (Tajfel & Turner, 1979), it is likely that perceived intergroup conflict will also trigger and/or modify experiences of stereotype threat which suggests that identity salience by comparative intergroup interactions such as intergroup

competition and conflict could create a predicament of evaluative scrutiny may trigger stereotype threat.

## **5.2 Perceived intergroup conflict and hostility**

Perceived intergroup conflict between groups can be induced through hostile environments in which there exist negative or derogatory stimuli. Intergroup conflict can be described as the extent to which groups being compared perceive relations between groups to be cooperative or conflictual, with increased intergroup conflict defining more conflictual intergroup relations and less intergroup conflict defining cooperative intergroup relations. Competition between groups results in in-group bias and out-group discrimination which is the basis for stereotyping.

In the 1990's research was conducted to learn about the impact of hostile environments. Early research was undertaken by Crandall and Thompson (1994) cited in Oswald and Harvey (2000) to examine the impact of a derogatory remark on the evaluation of obese black and white males compared to thin black and white males, minorities found that stigmatized groups were evaluated more negatively after a confederate's derogatory remark. The derogatory remark created a hostile environment in which it became socially appropriate to act negatively toward the stigmatized group members (Oswald & Harvey, 2000). In addition Schiffhauer (1994) cited in (Oswald and Harvey (2000) created an environment that was sexually harassing toward women by using swim-suit calendars and sexist comments. Although not directly related to women's math ability, the stimulus primed a negative stereotype that men perform better than women on math. This hostile environment resulted in women attempting fewer math problems than men.

A noteworthy study which focused on hostility was conducted by Oswald and Harvey (2000), who found that negative or derogatory stimuli prime negative gender stereotypes which may decrease test performance for women. However, Oswald and Harvey (2000) found that the number of math problems answered correctly by women was higher when the testing environment included the prime which facilitated conflict with the outgroup. This prime was included in the environment of the females by hanging a cartoon on the wall where the student

sat. This cartoon depicted a girl which was struggling on an easy math problem and a boy who is solving a more difficult math problem. In the control condition the environment did not include the negative prime. The findings of the study reveal that ST-underperformance were apparent for the women in the condition of the offensive cartoon *and* the stereotype however when the stereotype was no longer ambiguous in the stereotype -removal message that males and females do equally well on this test condition women's test performance increased. This finding was refreshing, since altering stimuli in the participants the test setting could improve test performance in ST conditions the environment of the target. Oswald and Harvey, (2000) found that stereotype threat and the prime in the testing environment which facilitated conflict with the out-group significantly interacted to affect the female students math performance. Similarly Adams, Garcia, Purdie-Vaughns and Steele (2006) found that men who believed that an experimenter was sexist (and prejudiced against women) performed better on a logic test than men who had no reason to have this.

### **5.3 Gender differences in response to intergroup conflict**

Gender differences in response to negative stereotype and conflict are apparent in many studies conducted in the early 1980's most of which are cited in Eagly, Wood, & Valerie, (1982), Eagly and colleagues (1982) conducted a study which revealed that male and female respond differently to stereotypes on gender. The participants were required to indicate personality attributes of a man and woman employed full time or a man and woman who stays at home and cares for the children (ibid.). The participants would ascribe stereotypical roles of male and females depicted by society, and reflected the traditional stereotype that men are instrumental or task orientated and agentic whilst women are expressive, communal or socio-emotional and employed women were seen as more instrumental and less expressive (ibid.). These authors maintain salient sex differences in gender stereotypes arise from varying roles of male and women in society that are observable in our daily lives as a product of role differences in gender but are not considerably detected in laboratory research which controls for these factors (ibid.).

Oswald and Harvey's (2000) aforementioned study also measured the emotions of female students, and found that in conditions of stereotype threat and conflict condition females felt more frustrated compared to female students in the stereotype threat removed and conflict

condition that felt more calm, confident, less embarrassed and less preoccupied. There was no evidence that women in any of the conditions felt significantly more anger in the conflict compared to the conflict control condition. Traditionally men exhibit more modeling of aggression (e.g., Bandura, Ross, & Ross, 1961; Madsen, 1968 cited in (Reinisch & Sanders, 1986) and display higher frequencies of spontaneous physical aggression such as hitting and fighting than do females (e.g., Archer, 1976; Frodi et al., 1977; Hoyenga & Hoyenga, 1979; Maccoby & Jacklin, 1974 cited in Reinisch & Sanders, 1986) and demonstrate more aggression in interactions with peers (e.g., McIntyre, 1972, cited in Reinisch & Sanders, (1986).

In a study conducted by Reinisch and Sanders in 1986 adolescent undergraduate males and females were asked to complete the Leifer-Roberts Response Hierarchy (Reinisch Revision) in a psychology class. The test measured the potential for overtly aggressive behavior or thoughts by eliciting a subject's choice of alternative responses to a variety of hypothetical situations involving moderate levels of interpersonal conflict (ibid.). The adolescents had the option of four responses, namely physical aggression which entails physical violence, verbal aggression which includes coercion, non-aggressive coping through using authority or forgiving the transgressor depending on the story, and withdrawal which involves physically leaving the situation (ibid.). Although verbal aggression was the most frequently chosen by both sexes, men on average 69% of the men would be classified as physically aggressive in responding to interpersonal conflict whereas only 31% of the females responded this was men had low scores for the withdrawal and non-aggressive responses compared to women (ibid). The highly significant sex difference in response to conflict is apparent, the women choose to respond in less direct aggressive action such as the verbal and physical aggression responses, and did chose to passively be non-aggressive in contrast to withdrawal (ibid). Since the 1990's, there has been little research conducted on the gender differences in response to negative stereotype and conflict. The lack of research on gender differences in response to negative stereotype may be as a response to the studies which show that there are no personal differences in the ability between men and women in male dominant domains (Fox, 2001).

## **Chapter Six: Social Identity theory**

### **6.1 Introduction**

Social Identity Theory (SIT) asserts that identity has both individual and social components (Tajfel, 1978). Social identity is the knowledge and emotional or value significance that a person holds about a group when they feel that they are part of a group (Abrams & Hogg 1990). A person's self esteem therefore contains both a personal identity and a social identity, for example "us" women and "we" South Africans. Therefore an individual's identity is bound up with both personal characteristics and group membership (which motivates people to attain and maintain a positive self esteem (Worchel, Rothgerber, Day, Hart, & Butemeyer, 1998; Redman, 2010). For example a soccer fan will look for other reasons other than the fault of the team as to why the team did not perform well, for they identify with the team and do not want to damage their own self esteem (Posten, 1998). A sense of involvement, concern and pride is derived from one's group membership with others (Worchel et al., 1998). For example the anger that people felt for their nationality at the when the US experienced the September 11<sup>th</sup> terrorist attack (Jennifer & Larissa, 2006).

### **6.2 A brief history of social identity theory**

Social Identity Theory was originally developed to understand the psychological basis of intergroup discrimination ( Goethals, 2003). Social identity theory was rooted in a series of studies on social categorization, ethnocentrism and intergroup relations conducted by Henri Tajfel in the 1960's and the 1970's. Initially SIT was termed social identity theory of intergroup relations as the famous "summer camp experiments" and the minimal group experiments focused on conflict and intergroup relations.

Close to half a century ago, in 1966, Sherif conducted realistic group experiments which studied the group life in the intergroup interactions in real contexts. The Sherif and Sherif in 1969 illustrated that intergroup conflict and competition for scarce resources created intergroup bias, stereotyping and hostility between two arbitrary defined groups of boys. In the experiment boys that did not know each other were chosen to be monitored in a summer camp experiment.

On arrival at the summer camp the boys were allowed to mingle with each other and Sherif and Sherif (1969) observed spontaneous group formation. Later the boys were split into two arbitrary defined groups that were kept away from each other and through intragroup activities they formed group cohesiveness, group norms and group names. This phase can be described by the term “depersonalization” which is commonly referred to by Steele (1997, 2010) and was only later in SIT literature was formulated by Turner, and colleagues (1987), and used to refer to individuals tendency to comply to the norms of a group as they believe a social group that experiences the same challenges will hold the same underlying values or inclinations as themselves. Next, the two groups competed against each other in a goal directed tournament in which they won points. The group members expressed strong negative feelings toward each other, and boys whose status had been threatened resorted to overt acts of prejudice and ingroup bias (Tajfel, 1970 cited in Wetherell, 1996). The boys of the experiment had expressed bias attitudes toward the out-group such as out-group which included glorification and over-estimation of the in-groups achievements and denigration and underestimation of the out groups achievements (Wetherell, 1996). However such hostile intergroup behavior was reduced and intergroup cooperation occurred when group members were given a task which entailed a mutually super-ordinate goal (Tajfel & Turner, 2001; Wetherell, 1996).

The early experiments of Sherif and Sherif (1969) highlighted that intergroup conflict increased threat to one’s group identity resulting in behavior consistent with the group norm and goal oriented cooperation between groups eliminated the pressure to attain a distinct positive group identity (Wetherell, 1996). Intergroup conflict increased intergroup categorization perceptions of intergroup differentiation and out-group homogeneity and the pressure for group members to conform to in-group standards (Tajfel & Turner, 1979; Delamater & Myers, 2007).

Later in 1972, the focus of research shifted away from realistic group experiments toward Tajfel and Turners (1970) minimal group experiments attempted to identify the *minimal* conditions that would lead members of one group to discriminate in favour of the in-group to which they belonged and against another outgroup (Tajfel, Billig, Mundy & Flament, 1971 in Goethals, 2003). Tajfel’s and Turner’s (1970) study was conducted with students that were adolescent or younger children. The students were divided into two groups by their preference

of paintings done by “Klee and Klandinsky”. The students were randomly assigned to either of the two groups and were given the impression that they were divided into two groups on the basis of their preference of two famous painters. With their group membership kept anonymous, the students then worked individually from cubicles. Their task was to allocate points worth money to “Klee and Klandinsky” groups using Tajfel’s (1981) matrices. The matrices included the following four basic strategies, namely fairness, maximum joint profit, maximum in-group profit and maximum difference. The fairness strategy is more accurately referred to as parity which reflects the numerically equal distribution of points between the in-group and the out-group. Maximum joint profit is referred to as the economically rational strategy whereby the total number of combined points to the in-group and the out-group is maximized. Maximum in-group profit is a strategy that rewards the highest number of points to the out-group. Maximum difference is a point allocation strategy that offers the maximum amount of difference between in the in-group and the out-group and is discriminatory against the out-group at a cost sacrifice to the out-group but in favor of the in-group. The strategies articulate the competitive nature of intergroup relationships. Most participants choose the maximum difference strategy to maximize self-esteem by maintaining a positive status of the group to which one identifies with (Tajfel & Turner, 1970 in Wetherell, 1996). The minimal groups paradigm was revolutionary since it argued that mere categorization of people in to distinct groups was sufficient to produce in-group favoritism against when no contact was made between group members and there is not obvious self-interest involved” (Wetherell, 1996).

Later Tajfel and Turner’s (1970) intergroup bias and discrimination was investigated in numerous studies and researchers began to rationalize that subjects define and evaluate themselves in terms of their imposed social categories and compare themselves in terms of the points of the scale a positive social identity can achieved in many ways strategies other than in group compared to out-group favoritism (Turner, 1987). As such researchers revised matrices include two additional strategies; the maximum relative other in which the in-group was allocated less points than the outgroup and the maximum relative own in which the ingroup was allocated more points to their own group than the out-group (Bornstein, Crum, Wittenbraker, Hasting, Insko and Thibant, 1983). The psychology of intergroup relationships are complex and later experiments highlighting the prisoners dilemma and the game theory indicate that



conflictual intergroup relationships can be perceived if a group receives feedback on the maximum relative other strategy and cooperative intergroup relationships can be perceived when a group that receives feedback on the maximum relative own strategy (Turner, 1987).

The experiments that lead to SIT thus far illustrates that intergroup conflict and hostile intergroup relations can be induced by the mere recognition of two groups (Wetherell, 1996) and suggests that additional hostile intergroup behavior in the backdrop of pre-existing stereotypes and groups in the real world, could result in more intergroup categorization and bias, and discriminatory behavior such stereotyping. These processes and behaviors are well known triggers of ST (Steele, 1997; Steele & Aronson, 1995; Steele et al., 2002; Wout, Jackson & Sellers, 2009).

Tajfel and Turner (1970) described three processes through which a social identity is clarified namely

1. social categorization in a group,
2. social identification with the image and value system of that group and;
3. social comparison to define or social identity with the group (Hogg & Vaughan, 2002).

Although defined somewhat cognitively the three processes highlight the psychological link between group identification and competition, for group members it entails creating meaning in the situation and responding strategically to the choices in the feedback of the out-group (Branscombe, et al., 1999). It also maintains that intergroup comparison and evaluations occur as a part of daily life in order to provide meaning in social situations the individual (Branscombe, et al., 1999). SIT is referred to as a socio-motivational theory which emphasizes how aspects personality and group membership motivate people to maintain a positive self esteem (Abrams & Hogg, 1990).

### **6.3 Taking Social Identity Theory seriously in relation to stereotype threat and lift**

Haslam and colleagues (2008) were able to describe stereotype threat and lift using social identity theory terminology and explanations, although their interpretation has not yet been empirically validated. They argue that when a target's salient social identity conflicts with his or her personal motivation to achieve positive self-esteem he or she will experience identity related psychological conflict and as a result perform poorly on a test (Haslam et. al., 2008). This phenomenon is called stereotype threat. However when a target's social salient identity is compatible with their sense of self they are motivated improve their performance which typically demonstrates stereotype lift (Haslam et. al., 2008). This paper treated ST and SL collectively as interlinked phenomena belonging to the same process of events to result in a change in performance; the direction of which can be garnered from the valence of the stereotype as indicated in ST and SL literature.

Although STT speaks about identity by discussing the influence of identity related variables in stereotype threat literature, it lacks a framework for understanding how stereotype threat and lift is experienced by the "target". SIT attempts to determine the circumstances under which the individual views himself as a member of a group or as an individual (Ellemers, et al., 2002) and behaves as such. SIT acknowledges that intergroup behavior is different from individual behavior, and group members may develop concerns about their group image, an integral part of their social identity (Abrams & Hogg, 1990). A situational predicament that results in individuals becoming fearful that they are treated not as an individual but as a member of a social category that is devalued by others is referred to as social identity threat (Derks et al., 2008). The group members believe that they will be excluded from their group and that they will endure bias treatment (Inzlicht, Aronson, & Mendoza-Denton, 2009). In some instances the individual will expend his or her resources to maintain or defend the esteem of the group to which he or she identifies with (Worchel et al., 1998). This is apparent in extremist group members such as suicide bombers who sacrifice their lives to defend the interests of the group (Gupta, 1990). Stereotype threat is one of the forms of the many forms of threat that a group member may experience in a situation (Branscombe et al., 1999; Purdie-Vaughns et al., 2008) which is dependent on a group members perceptions of how members of their group are generally treated or from stimulus in the environment (Derks, et. al., 2008). SIT focuses on the

consequences of maintaining positive personal and social identities for individual perceptions and group behavior by recognizing that a group member's perception of self and others and their behavior in the group is determined by they interpret their social positioning in a social context in relation to others (Ellemers, et al., 2002).

The group member whose identity is threatened may use one of many coping strategies to deal with the threat of losing their status such as social mobility, social competition, social creativity and social change (Ellemers et al., 2002; Wetherell, 1996). These strategies will now be described using Wetherell's (1996) paper. Social mobility is used to describe a process through which the individual leaves the in-group to join the higher status group whose status is not threatened. Social competition occurs at a group level when the group member's status is insecure and group members help each other improve their outcomes or performance as a group. Social creativity is considered a cognitive strategy which alters group member's perceptions as it the group member may redefine his or her existing dimension of comparison by seeking new dimensions of comparison or changing the outgroup comparison group. Social change is when the group members change the position of the social group. Riecher (1984) cited in Riecher (1996) discusses how that riots of the crowds that belonged to the St. Paul's Defence Campaign used violence toward the police as a behaviour in the strategy for social change to redefine their relationships with the police as outsiders. A behaviour that is considered violent, senseless and bizarre could only be understood on analysis of the social context in which it takes place (Riecher, 1984 cited in Riecher, 1996).

It can be argued that the aforementioned coping strategies are practiced when a negative stereotype is made salient in the testing context of a group member. This is similarly found in stereotype threat literature whereby invoking alternate group identities (Shih et al., 1999; Aronson et al., 1999) and making individual identity salient (Ambady, Paik, Steele and Owen-Smith, 2004) has shown to improve test performance of stereotype threatened group. The strategies that a group member will use depend on the features of the social structure that shape their social identity (Ellemers et al., 2002). This includes the social stratification or status position of the groups, the security of the social status, permeability of the group boundaries, legitimacy of personal or group status and the and will now be described using Ellemers and

colleagues (2002) paper. Social stratification refers to the division of power among groups. High status groups are the groups with the most power and low status groups are the groups with the least power. The security of the social status is when for example high status groups keep power (secure) due to social structures in place and the remainder of the power is shared with the insecure groups being the groups in which the status is changing or is amenable to change. The permeability of the groups is the ideological belief system regarding the nature and structure of relationship between groups. The legitimacy of the group is explained when status relations are justified which results in incomparability of the high and low status groups (Ellemers, 1993). The stability of groups is the status hierarchy between groups which when unstable in groups that have been threatened will result in greater commitment to the in-group and desire to improve the position of this group (Ellemers, 1993). Ellemers and colleagues (2002) asserts that people who have a low social identity with the group will use strategies that improve their personal situation whilst those people who highly identify with a group may respond by using strategies that improve the group status as a whole.

SIT recognises that the person is active in choosing to react to threatening social conditions by using group level or individual level strategies (Ellemers et al., 2002; Ellemers & Van Rijswijk, 1997). These strategies are familiar as they underpin some of the consequences or effects of stereotype threat described in chapter 1. In addition at extreme cases one may behave as a member of a group more than as an individual even when one's behaviour as a group member may not be personally relevant and may even place the individual identity at risk. SIT "helps to understand the behaviour of those whose identity is perceived to be threatened" (Hewstone & Greenland, 2000) and extremist behaviour that might seem irrational for example suicide bombings in terrorist attacks and strikes such as the laying down of tools by government workers.

### **6.3 Stereotype threat, lift, and conflict**

Stereotype threat occurs when a decrease in test performance of group member of a low status group occurs as a result negative stereotype (Steele & Aronson, 1995). SIT research has shown that during overt conflict group membership becomes more salient, individual identity is minimized, and individuals are likely to identify more with the in-group and less with the out-

group (Hewstone & Greenwald, 2000). SIT proposes that increased perceived conflict between groups (including competition for scarce resources) increases category awareness; increases in-group and out-group depersonalization; and modifies how much people identify with the in-group and out-group. Therefore a social situation in which there is intergroup conflict between individuals that are categorized as members of the groups in conflict could accentuate threats to salient social identity. It is possible and likely that in some social situations intergroup conflict will therefore impact on stereotype threat. Exploring the impact of conflict on STL will allow us to better understand if socio-structural variables proposed by SIT might be useful extensions to STL theory

#### **6.4 Stereotype threat and hostile stimuli**

Oswald and Harvey (2000) were able to show that stereotype threat and hostile environment interact with a negative stereotype affect women's performance on a math test. They found that women had been exposed to a derogatory sexist cartoon of a man that was hung on the wall performed better on a math test than those who received the stereotype removal message. In addition women who were exposed to the derogatory cartoon and who received the stereotype threat removal message performed worse on the math test. Oswald and Harvey (2000) argue that the hostile environment can promote stereotype reactance in which case the women receiving a message that the test is not gender prejudice created a weak ambiguous bias were to act against the stimulus and performed well. Although the interaction between the negative stimulus and a negative stereotype was apparent it is theoretically unclear how a salient positive stereotype may change test performance. Furthermore, Oswald and Harvey's (2000) notion of "hostility" was not embedded in any theoretical framework of how conflict might impact on identity.

Neglecting research on socio-structural variables is illogical given that STT is based on a situationist view which refers to ST as "social-psychological predicament" of a person's social identity in the testing situation (Steele & Aronson, 1995). The intervention to improve underperformance needs to address the social circumstance of the person to remove the threat. Socio-structural variables have been shown to influence identity management strategies which people use in social conditions in which their identities are threatened (Spears, et al., 1997).

Furthermore more these strategies are resources that are required for the completion of the task in conditions of stereotype threat; in which a negative stereotype is made salient (Iserman, Davies, Quinn, & Spencer, 2009; Schmader, et al., 2008; von Hippel et al., 2005; Mary, Murphy, Steele, & Gross, 2007).

Focusing only on individual and internal constructs suggests that stereotype threat is internalized, but Steele (1997, 2010) highlighted the importance of structural variables in an individual's environment that can be altered such that negative "identity contingencies" can become irrelevant negating the ST underperformance. He maintains that the focus should be on changing the contextual contingencies to which all of the internal processes are an adaptation instead of focusing on the internal manifestations of identity (Steele, 2010).

If ST is the result of a specific type of identity contingency, then changes in test performance can occur a result of the changes in either or all of the following: the stereotype;; the testing context; individual shifts in identity; and shifts in social identity, such as shifts in socio-structural variables such as permeability, stability, legitimacy and conflict. Applying SIT to the phenomenon of stereotype threat – whilst avoiding what Reicher (2004) refers to a "reductionistic misreadings" of the framework – requires us to consider the intergroup context in a great deal more detail than has been done previously in terms of key socio-structural variables such as permeability, stability, legitimacy and conflict.

### **6.5 The role of perceived intergroup conflict in stereotype threat, lift contexts**

Seunanden, (2008) simulated a situation in which group status and intergroup conflict were manipulated in order to measure the change in on stereotype threat and lift. It set out to test if perceived conflict is likely to amplify the negative stereotype threat. Group status was manipulated by subtly activating negative stereotype about the in-group cognitive abilities in relation to the out-group. The performance on the Ravens Advanced Progressive matrices (RAPM), presented as a measure of post degree success, and was used as a dependent measure of stereotype threat or lift as it was. In order to introduce the manipulation of perceived inter-group conflict or cooperation the students completed a simulated intergroup computer interaction based on Tajfel's (1981) distribution matrices in which members of the (virtual) out-group consistently

behaved in cooperative or conflictual ways. Finally the RAPM was used as a dependent measure of the presence of STL in the in-group.

The results of the study indicate incongruent differences in STL for high performers under conflict, in other words that when the groups were in conflict participants in the high status lift group displayed *reduced* performance and those in the low status threat group exhibited *increased* performance. The findings suggest that conflict and status interact to result in differential STL-performance on pre-existing levels of performance. The findings were discussed by Seunanden (2008) as incongruent with Aronson et al., (1999) findings that stereotype threat affects the academic vanguard or the students that are most talented and motivated to perform. Since the empirical stereotype threat effect is difficult to measure in real life settings in which the impact of SAT is common knowledge to test takers, the APM was divided into six levels of performance called and the interaction effect was analyzed at each level. However, this procedure was unconventional and it was not clear whether the observed differences in performance were real empirical findings or artefacts of the method. A better procedure would have been to include a measure of performance prior to the STL manipulation to allow complete analysis of results across levels of pre-manipulation performance (Seunanden, 2008).

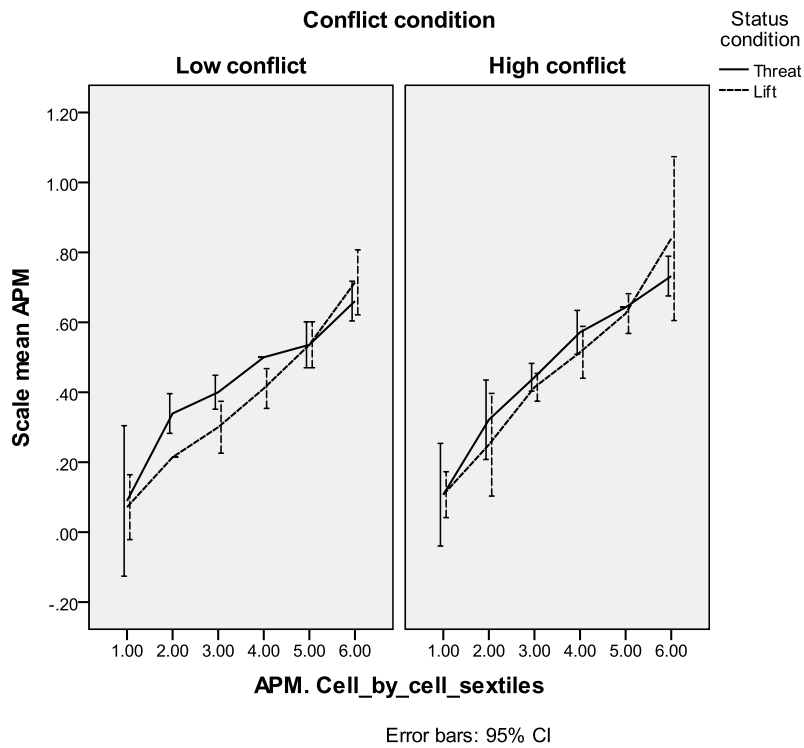


Figure 6.1. Adapted from Seunanden (2008), illustrates APM scores for each level of performance across status by conflict.

In attempts to further investigate the relationship between intergroup conflict and competitive relations on STL performance the current study will replicate the pilot study conducted by Seunanden, (2008) but to include two additional variables: 1) a stereotype control condition, to eliminate alternate explanations for stereotype threat or lift and 2) an independent pre-manipulation measure of performance, to allow full analysis of the findings observed in Seunanden (2008). In this study the Shipley Institute of Living scale (SILS) was used as an independent pre-manipulation measure of performance as it correlates well with the RAPM. In the stereotype control condition a stereotype was not invoked.



## Chapter Seven: Methodology

### 7.1 Introduction

As previously highlighted in the literature review invoking stereotype threat requires (1) a set of categories and (2) a set of category-linked task-relevant group stereotypes that are (3) either relevant (for the experimental group) or not relevant (for the control group) to the performance of the dependent measure. An experimental design was used in this study to collect data from students in socially innocuous pre-existing real group categories, namely science versus humanities students rather than more serious ones such as race and gender. These social categories (science and humanities students) had the potential of being plausibly described as being in conflictual or cooperative relationships in a way that allowed random assignment to conditions. Participants were exposed to a pre-existing stereotype on the strengths and limitations of the cognitive orientations of Science and Humanities groups in the form of task instructions. It is important to note that although the humanities participants are made reference to several times in this section they are merely a virtual group that was presented to the participants as a focus of intergroup comparison. Although the real participants (science students) believed that humanities students were also participating, no actual humanities students were sampled. The APM was presented as a task that was diagnostic of future post future success for all participants. The APM was presented as an ambiguous task that was used as a dependent variable that measured a shift in performance indicative of STL. As the previous study (Seunanden, 2008) had found that the changes associated with STL performance are different depending on the student's level of performance. In the current study the Shipley Institute of Living Subscale (SILS) was administered to the students as an independent baseline pre-manipulation measure of performance to allow full analysis of Seunanden's (2008) findings.

### 7.2 Research Design

A 3x 2 factorial design was used for the post-test experimental design. This factorial design contained the following manipulations: Group status (Low/ High /No status activation) \* Inter-group conflict (High/Low), as displayed in Table 8.1below.

Table 7.1

*Conflict and status group categories*

| Status               |                     | Low Conflict<br>(Cooperative intergroup<br>relations) | High Conflict (Hostile<br>intergroup relations) |
|----------------------|---------------------|---|---|
| Status Activation    | Threat (low status) | LC-T  | HC-T  |
|                      | Lift (high status)  | LC-L  | HC-L  |
| No Status Activation | Control             | LC-C  | HC-C  |

Note. 3\*2 factorial design

The design included six group categories; namely the low conflict threat group that received the cooperative low conflict manipulation and stereotype threat status manipulation; the low conflict lift group lift group that received the cooperative low conflict manipulation and stereotype threat status manipulation and the low conflict control that received the cooperative low conflict manipulation and the status control manipulation; the high conflict threat group that received the high conflict manipulation and stereotype threat status manipulation, the high conflict lift group lift group that received the high conflict manipulation and stereotype threat status manipulation and the high conflict control that received the high conflict manipulation and the status control manipulation.

Since inter-group conflict requires awareness of category membership, it was not possible to include a control condition in which conflict was manipulated but group membership was not made relevant to the task. However, a control condition was included in which the categories were activated in conditions of high or low conflict, but no stereotype regarding performance was explicitly activated. This provided the baseline to compare the experimental conditions to show the differences in stereotype threat and stereotype lift on task performance (Steele, 1997, Steele, 2003, Steele & Aronson, 1995, Walton & Cohen, 2003, Aronson et al, 1999).

### **7.3 Hypothesis and expectations**

This study has two objectives, namely to firstly replicate STL in a South African educational context (as very few South African studies have been undertaken in this area); and second, to investigate the applicability of Social Identity Theory to STL by experimentally testing whether different intergroup conflict conditions modify the changes in performance associated with STL in an experimental context. This study seeks to answer the following questions: (1) What changes do conflict conditions have on student performance in the high and low status groups (i.e. the changes in performance associated with STL)? (2) Do different conflict conditions interact with group status to influence individual experiences of identity or their identity strategies?

### **7.4 Sample**

A total of 122 students enrolled at the University of Kwa-Zulu Natal of the faculty of Science and Agriculture were sampled using convenience sampling strategies. This strategy was chosen as it was practically less demanding to access a large sample of participants in a short period of time (3 weeks). In addition this research is the form of a Masters project which has a limited access to resources and is constrained by time. The sample included all students registered for Science attending UKZN-Pietermaritzburg. Therefore the sample contained Indian, Coloured, Black African and White racial groups that were South African and other nationalities. Males and females were included in the sample. Students at undergraduate levels as well as postgraduate levels participated. The students who participated were between 20 and 30 years of age. These students were enrolled for a variety of different degrees within the faculty of Science and Agriculture, but no students from other faculties were sampled.

### **7.5 Manipulations**

#### **7.5.1 Status manipulation and stereotype Activation**

All participants were provided with information on the diagnostic nature of the APM which was presented as a measure intelligence and academic ability (Attached as Appendix B-D). In addition the test instructions presented the cognitive ability and criteria that was required to have post future success (Attached as Appendix B-D).

Previous research shows that the presence of categories is sufficient for a stereotype to become relevant (Bourhis, et al., 1994) and by using testing materials, reports, test instructions that reinforce a common stereotype about a group performance differences compared to another group a person can experience stereotype threat (eg. Hoyt & Blascovich, 2010; Leyens et al., 2000; Pronin et al., 2004). The commonly held stereotype that science students are analytic thinkers and humanities students are flexible thinkers was used in this study.

Participants were presented with materials which told them that the study compared the ability of humanities and science students or investigated their cognitive ability (see Appendix B-D). For the conditions in which a stereotype was activated the link between APM as a psychometric, diagnostic test of ability and post-degree success was used to introduce a goal which both the groups were now competing for (See Appendix B-D). This introduced competition for resources, namely jobs which are scarce in the South African context. Competition for scarce resources has been empirically shown to induce intergroup conflict (Wetherell, 1995). Furthermore the groups now had competing interests that is to maximize their opportunity for post future success making them more motivated to try to perform their best.

### **7.5.2 High and low status condition**

Participants were presented with information that their group either possess or did not possess the cognitive orientation that was required for successful completion of the APM and to master their future material and have success in professional careers (See Appendix B-D). For simplicity the following instructions that were included in the test for participants in the low status condition (stereotype threat) condition will be described:

“It is well known that people with a flexible cognitive style are much more likely to succeed in their degrees and in the job market. On the other hand, people who are too analytic are more likely to fail. Students with an analytic cognitive style are therefore at a serious disadvantage.”

To reinforce the difference in cognitive orientation the instructions then went on to describe the characteristics of the person with the required cognitive orientation.

“People with a “flexible” cognitive style:

- Are adaptable thinkers
- Can process conflicting information
- Can find multiple solutions to complex problem”

The materials that made the participants aware that their group did not possess the required cognitive orientation also indicated that the Humanities students possessed the required cognitive orientation substantially disadvantaged on their performance on the APM test.

“DID YOU KNOW?

Science programmes attract and produce students with analytic cognitive styles while Humanities programmes attract and produce students with flexible cognitive styles.

The task that follows called the Raven’s Advanced Progressive Matrices tests the cognitive ability of students. This test is more suited to students with a strong flexible cognitive style than students with a strong analytic cognitive style. Therefore Humanities students are more likely to do well compared to Science students. You are encouraged to try your best in this test.”

The same manipulation with the words “flexible” and “analytic” interchanged was used in test instructions for the high status or stereotype lift manipulation. Alternatively the materials that provided the information that the science students had the required cognitive orientation activated stereotype lift. The materials that provided the information the science students had the required cognitive orientation activated stereotype threat. These materials that made the participants aware that their group possessed the required cognitive orientation also indicated that the Humanities students did possess the required cognitive orientation which substantially advantaged their performance on the APM test.

### **7.5.3 Status control condition**

The instructions for the status control manipulation were not diagnostic or evaluative of ability (See Appendix D). The materials illustrated the problem of employment in South Africa and the importance of understanding the factors that predict post-future and work success. The cognitive orientation of the science and humanities students was not included. The instructions illustrated the correlation between high cognitive ability and future and work success. The instructions in the materials did not include the competition for post degree success rather it

highlighted the need for the participants to perform well on the APM which is a measure of cognitive ability and an indication of future and post future success.

One of the limitations in the design of the study conducted by Seunanden (2008) was that a control group in which stereotype threat or lift is not activated was not included. By including a control condition in which status was not manipulated the researcher will then be able to understand what occurs during stereotype threat and lift compared to a group that has not been introduced into the experimental condition. Thus by including a control group the researcher we can eliminate plausible rival hypotheses and account for extraneous variables that may have masked the changes seen by Seunanden (2008).

#### **7.5.4 Conflict manipulation**

The conflict manipulation entailed manipulating the perception of intergroup conflict with the out-group. All participants completed a computer simulated interaction with the Humanities group (out-group category). This task involved allocating points worth money to both the in-group (their group-Science) and the virtual out-group (the other group-Humanities). This was done using Tajfels (1981) matrices adapted from Bomstein et al., (1983) which included the following allocation strategies: minimal own profit, maximum joint profit, maximum relative own profit, minimum difference, maximum other profit, maximum joint other profit and minimum difference profit (see figure 7.1 below). The chapter 6 on social identity theory in the literature review discusses in more detail what each of these allocation strategies entail for the ingroup. In groups of three each individual in the group of three science students were required to choose from one of seven strategies in the matrices.

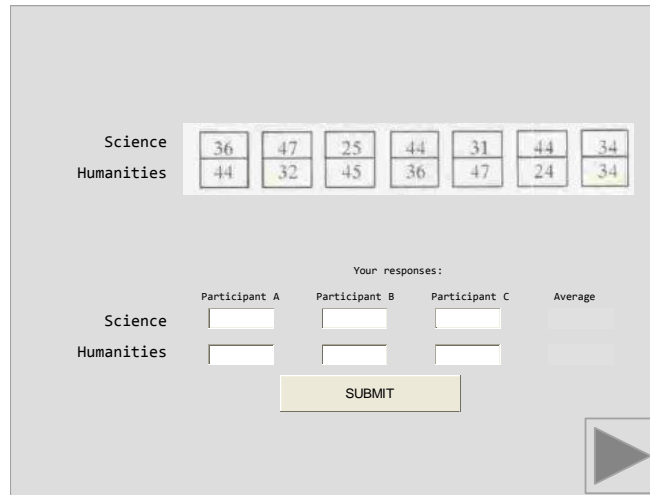


Figure 7.1. Example of Tajfel’s (1981) Matrices adapted from Bornstein et al., (1983) used in the conflict manipulation

**7.5.4.1 Computer simulated interaction.**

A fifteen minute computer powerpoint presentation was designed to simulate a realistic computer-mediated networked interaction between the in-group and the out-group. Since the Faculties of Science and Humanities largely operate from two physically separate campuses it was believable that the software was needed to facilitate interaction between the two groups. Two versions were developed to produce the cooperative and conflictual conditions and. At the outset the computer programme described as networked communication software that enabled the decisions of the science students to be communicated to the humanities students and vice versa.

The science students were informed (by onscreen instructions) that their collaborative decisions as the “science group” would determine how much remuneration the humanities students would receive and the decisions made by the humanities students will determine how much they would get paid. Participants completed the simulation in groups of three and were completed five trials with to provide individual responses prior group discussion before each trial. Each of these five trials included different matrices of choices. Other than the initial trail,

participants were given either pre-programmed conflictual or cooperative feedback on the allocation choices of the outgroup (humanities). Each trial consisted of matrices which were presented as a total of seven allocation strategies of which participants had to choose one. The computer mediated programme required to strategize point allocations to the out group and the in group. Two versions of the programme were built; one version with a pre-programmed conflictual feedback strategy (High conflict status) and one version with a pre-programmed cooperative feedback strategy (Low conflict status) (see figure 7.2 and 7.3 below).

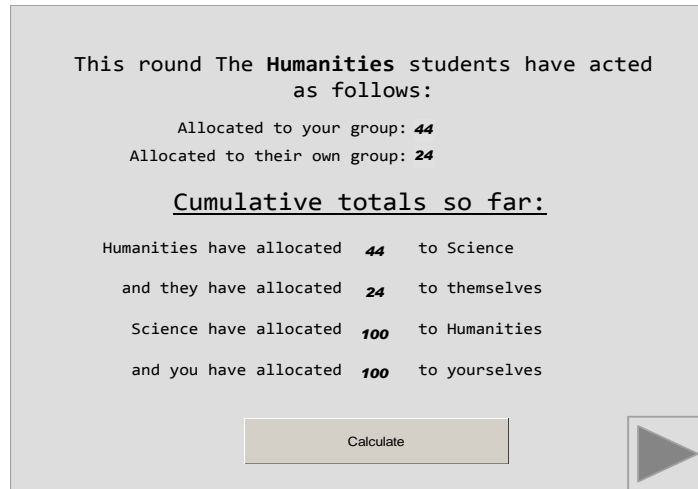


Figure 7.2. Adapted from Bornstein et al., (1983) feedback response for low conflict condition

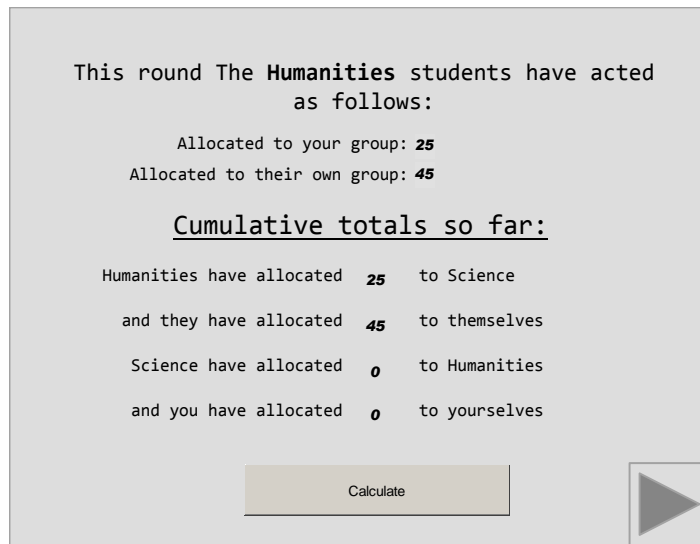


Figure 7.3. Adapted from Bornstein et al., (1983) feedback response for high conflict condition



In order to manipulate inter-group hostility the participants were given feedback of the humanities students' reward-strategy decisions that would be interpreted as clearly hostile or clearly cooperative cooperative reward strategies. The high conflict condition provided feedback that the out-group were consistently choosing the lowest possible reward for the science group regardless of the fact that the out-group were also punishing themselves to do so, The low-conflict cooperative condition provided feedback that the out-group were consistently choosing the highest possible reward for the science students.

The extent to which this inter-group interaction could be construed as conflictual or cooperative was increased by informing participants that the points awarded by the out-group would determine the ingroup's monetary reward for participation. In other words, the monetary incentive was something that was valued but could only be attained by inter-group interactions.

## **7.6 Data analysis**

The data was analyzed using IBM SPSS Statistics 19 for windows. A reliability analysis was conducted for all the scales (see appendices), however the scales useful to our argument will be further discussed below. In addition a factorial ANOVA and Multiple Regression was conducted in order to understand the relationship of status and conflict on APM performance. This will be discussed in chapter 9.

## **7.7 Measures**

The following measures were administered in this study: the Shipley Institute of Living Scale (SILS), the STL manipulation check, the Raven's Advanced Progressive Matrices (APM) and the social identity theory inventory self report scale which provides subscales of conflict, subjective experience, effort, achievement motivation, in-group homogeneity, out-group homogeneity, group differentiation, ingroup identification, individual identifiability, group identifiability, legitimacy, stability, permeability, realistic threat, symbolic threat, category salience, previous academic performance, social desirability and demographics (see Appendix E). The measures were piloted on 36 postgraduate students. (STL Manipulation Check=  $\alpha =$

.956;  $u = 5.383$ ;  $SD = 1.311$ ). The STL manipulation check, the APM and task-stereotype congruence were previously administered to 102 science students.

### **7.7.1 Pre-manipulation measure of performance: Shipley Institute of Living Scale**

The Shipley Institute of Living Scale (SILS) Abstraction Subtest was administered as a separate test prior to the conflict and status manipulations as a baseline measure of ability and motivation within the experimental setting. The SILS was used as a pre-manipulation measure of performance as it correlates well with the RAPM. However the SILS includes items that require the test taker to complete the series such as ESCAPE SCAPE CAPE \_\_\_\_ \_\_\_\_ \_\_\_\_ where the answer is APE (cited in Motuba, 2009) which is in a completely different format from the APM which entails fitting a picture into a puzzle (see Bors and Stokes, 1998) and is unlikely to introduce practice effects or other confounds. Using a measure of performance independent of the STL manipulation should control for pre-existing differences and individual variation (Steele & Aronson, 1995; Steele et al., 2002). As such SILS was used to isolate the interaction effect of status and conflict on the post manipulation performance on the Raven's Advanced Progressive Matrices (APM).

The SILS is twenty item test of general abstraction ability developed in 1940 and basically unchanged since then (Mason & Ganzler, 1964). Senior (2001) cited in Motuba (2009) reports a median correlation of .72 with the Advanced Progressive matrices based on data from twenty studies. In addition Bors & Stokes (1998) used the abstraction subtest of the Shipley to validate their short form of the APM and report a correlation of .73. The SILS was piloted alongside the 15-item short form of the APM (Combining the Bors and Stokes, 1998 version with the easiest items from the Arthur & Day, 1994 short-form). Reliability for the SILS was excellent ( $\alpha = .852$ ) and, in line with studies reported in the literature, correlated well with the APM ( $r = .628, p < .01$ ). As such the SILS was used as a pre-test measure of the set of skills and abilities tapped by the APM.

## **7.8 Manipulation checks for status manipulations**

### **7.8.1 Stereotype threat and lift manipulation check**

The STL Manipulation Check included eight items that was designed to measure the extent to which a participant noticed and remembered the information relating to their group status before attempting the dependent measure. For example “Based on the description above, [LIFT GROUP] as a group have a good reputation with respect to Raven’s Advanced Progressive Matrices” and “Based on the description above, [THREAT GROUP] as a group have a good reputation with respect to Raven’s Advanced Progressive Matrices” In which the relevant science or humanities group is placed in the brackets (see Appendix E). The items marked with an asterisk are reverse-coded. The participant indicated his or her response on a seven point likert scale ranging from strongly disagree to strongly agree. These items were piloted on 23 psychology students and the Chronbach’s Alpha was .696. In addition these items were used in the study conducted by Seunanden (2008) and had a Chronbach’s alpha of .816.

### **7.8.2 Inter-group conflict manipulation check**

The conflict and hostility items designed to measure the extent to which the participants (science students) described their relationship with the out-group (humanities) conflictual or cooperative after completion of the conflict manipulation and the dependent task measure. Four items were included, for example “I feel IRRITATED when I think about interacting with [the outgroup]” and “I feel UPSET when I think about interacting with [the outgroup].” In which the relevant science or humanities group is placed in the brackets. The items marked with an asterisk were reverse-coded. This scale was used by Forbes (2008) and had a Chronbach’s alpha of .883. These items were used in the study conducted by Seunanden (2008) and had a Chronbach’s alpha of .735.

### **7.8.3 Dependent measure: Ravens Advanced Progressive Matrices**

A shortened timed version of the Raven’s Advanced Progressive Matrices (APM) (see Bors & Stokes, 1998) was used as the dependent measure. This measure was chosen as it was a difficult task which made the changes in performance associated with STL more likely. In

addition the APM has been previously shown the APM has high validity and reliability (Raven, 1989; Raven, 2000) and has been shown to be sensitive to stereotype threat in previous studies (e.g. Brown & Day, 2006; Croizet et al., 2004). Finally the APM is an ambiguous measure that presented as a task that required analytic skill for the high status condition and as a task that required flexible skill for the low status condition. Thus the APM can be understood in different ways by members of different conditions. Although the APM is a psychometric measure of educative ability in this study it was used in this study as an indication of the group-level *difference* between performance in high- and low-status stereotype activated and non-activated conditions. This inter-group level difference was used to reveal the presence of STL by comparing the participant's performance in the conditions rather than show individual performance on the measure as is usually the case.

This shortened version of the APM was chosen specifically for its high reliability (0.73 Bors & Stokes, 1998) and its practical use in of time saving. Thus a time limitation has introduced without compromising its construct reliability (Bors & Stokes, 1998). This form was administered to participants giving them a time limit of 15 minutes to complete all 14 items which ensured that the participants hand a minute on each item. This time limit was considered adequate for completion of all the items and helped the researcher control the time allocated for all tasks during the 40-45 minute time period. This time limitation also increased the pressure for the participants to complete the APM. This form included a total of 14 items 2 of which were practice items taken from set A of Raven's APM. Bors and Stokes (1998) indicated that the following subset of APM items; were item 1 from set 1, item 2 from set 2 and items: 3, 10, 12, 15, 16, 18, 21, 22, 28, 30, 31, 34 had a reliability ( $\alpha = 0.73$ ) As such this subset was used as the dependent measure of test performance.

#### **7.8.4 Social Identity Theory Inventory**

As previously highlighted the social identity theory comprised of the following subscales: conflict, subjective experience, effort, achievement motivation, in-group homogeneity, out-group homogeneity, group differentiation, ingroup identification, individual identifiability, group identifiability, legitimacy, stability, permeability, realistic threat, symbolic threat, category

saliency, previous academic performance, social desirability and demographics (see Appendix E). The stability, ingroup homogeneity and the academic history subscales will be addressed.

#### ***7.8.4.1 The stability subscale.***

The ingroup identification measure examines the participants' perceptions that the status hierarchy between groups is firmly entrenched and resistant to transformation, or fragile and likely to change. For example the following two items; "Even if they try their best, [low status group] will not overtake [high status group], it's unlikely that [high status group] will lose their good reputation." These items (see appendix E) were adapted from Mummendey, Klink, Mielke, Wenzel & Blanz (1999) to make them more specifically related to the intergroup status hierarchy and ask about "the difference" between groups rather than "relationship".

#### ***7.8.4.2 In-group homogeneity.***

This subscale was designed to measure the extent to which the participants felt that they were similar to other ingroup members. The items for the ingroup homogeneity scale include the following: "The [ingroup] is united, [Ingroup members] have similar values, [Ingroup members] have a lot in common and Most [Ingroup members] usually prefer doing similar things." The items were piloted on 23 psychology Honours students with a Chronbach's alpha was .777.

#### ***7.8.4.3 Previous academic history.***

This subscale was developed to measure the participants' university and pre university performance and was included after Seunanden (2008) found that previous test performance may influence a student's APM test performance under status and conflict conditions. Since SAT scores have been used as independent measures of intellectual and academic performance to reveal the underperformance associated with ST (Aronson and Steele, 1995) the following items were developed as independent measures of intellectual and academic performance. The first item required participants to select a mark between zero and 100 (in increments of five) that "best describes [their] usual academic performance" while the second and third questions asked for self-reported matriculation results (see appendix E). These items are unlikely to be valid or reliable indicators of *actual* matric performance, but remained in the scale as they were

comparable to the self-reported SAT scores used in many foreign studies. The subscale was piloted on 23 psychology Honours students at revealed an alpha of .613.

#### ***7.8.4.4 Demographic Information.***

In a subscale at the end of the Social Identity Theory Inventory all the participants were required to report their race, gender and nationality. These were identities that may affect the results of the study. In addition to ensure that all the participants were science students, the participants were required to indicate the future that they were registered for and how they would describe their degree.

Other relevant additional measures indicated above were included in a self report inventory (see Appendix E) in which the APM was enclosed but will not be discussed as they do not relate directly to the research question of the current study and were included only for compatibility with other sub-projects in a broader research project, but will not be discussed in this dissertation.

### **7.9 Procedure**

The procedure entailed 3 steps, namely the recruitment phase, the testing phase and the debriefing phase. Each phase will now be discussed.

#### **7.9.1 The recruitment phase**

Posters advertising the study were placed on all the main notice boards across the University campus and were available for viewing during campus hours. Pamphlets were distributed at the Agriculture building at the University of KwaZulu-Natal (UKZN-PMB) in areas surrounding the venue (Appendix B). These pamphlets were distributed at varying times on different days of the week during campus hours. These pamphlets were made available to participants as they passed by on their way to their respective daily activities and were also made available before and after lecture sessions for varying randomly chosen courses across all the campuses at the UKZN-PMB. Participants were also obtained via a snowball sampling strategy as participants who completed the study were at liberty to inform other science students about the study but were instructed not to reveal any details of what the study was actually about.

After assigning students to 40-45 timed sessions depending on their availability participants were randomly partitioned into groups of two to three and randomly assigned to levels of intergroup conflict and the status manipulation conditions using a randomized control schedule. The number of participants in each group was chosen due to the ease of administration of both the conditions. Since the task was a group task the least amount of participants that could be surveyed at one setting was two. Participants were assigned to the conditions as and when they were recruited.

### **7.9.2 The testing phase**

Participants completed the measures in groups of three. In the pre-manipulation phase, all the participants were given an undesignated amount of time to complete the SILS. The SILS was administered as a separate test required and the researcher announced that it was required to obtain norms for South African students.

The participants were told to read the informed consent sheet and sign it if they agreed to participate, if not they were free to leave. Next the conflict manipulation was administered and the researcher pretended to receive a mock phone call from a person who indicated that virtual humanities group was ready to begin the networking procedure with the science group. The participants were then instructed to pay attention to the monitor (see monitor 2 in figure 7.4 below) and complete the simulated computer programme. Next the status manipulation was administered. In this manipulation the participants read the instructions of the test which contained the flexible manipulation for the threat condition and the logical manipulation in the lift condition. After this the participants were completed the STL manipulation check. The participants then completed the shortened timed version of the Raven's APM followed by the social identity theory inventory.

### **7.9.3 The testing context**

Stereotype threat theory maintains that stereotype threat or lift is context sensitive and has the capacity to be easily influenced by subtle cues in the environment (Smith, 2004). Therefore in the environment all cues were limited to that of a testing environment in which

stereotype threat and lift has been investigated and shown to exist. In addition the setting was made as realistic to a testing context as possible to increase the face validity of the context. Thus all the appliances and tools that were in the room were real; for example a real phone was used to receive the mock call. Participants were formally greeted by the researcher and instructed to sit down in 2-3 chairs provided across the researcher. Participants were at one end of the desk facing monitor 1 (see below). The researcher was at the other end of the desk facing laptop from which she could control the computer simulated interaction and other events (monitor 2, see below). Thus the lap top was connected to the first monitor and a network cable. No live internet connections were made. The connection was made to simulate an interactive network connection with the Humanities students.

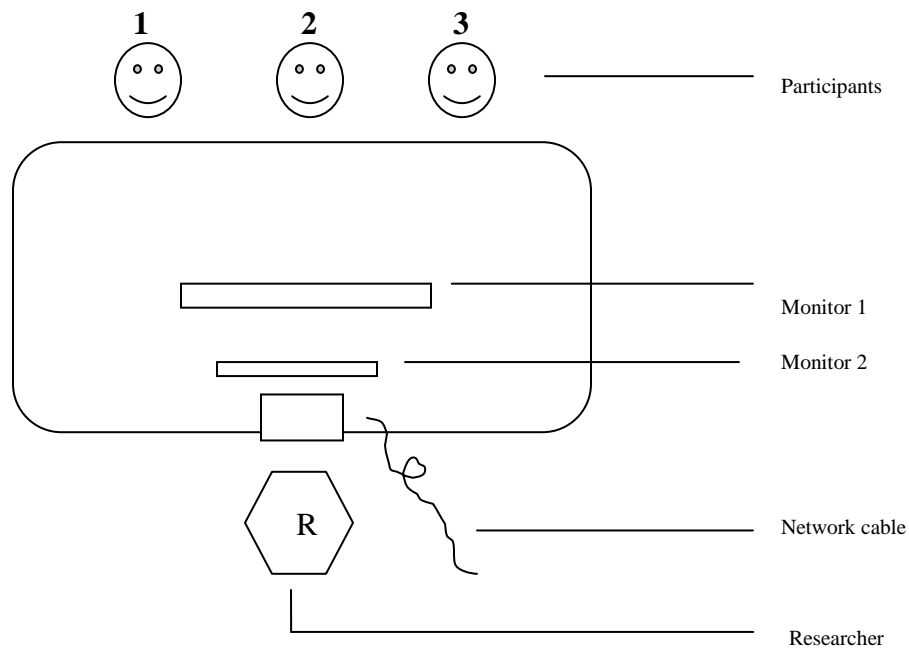


Figure 7.4. Diagram of the testing context.

#### 7.9.4 The debriefing phase

Once all the participants completed the required measures they were debriefed on the contents of the study. In addition they were given a debriefing sheet (See Appendix F) if they required more information on STL. The participants were told not to divulge the contents of this study to potential candidates. All participants were given R30 as an incentive for completion of the 45 minute procedure. The amount of the incentive was decided on by a firm consideration of



the time and effort participants would spend during the study. This incentive did not include the time taken to travel to the venue or any associated costs, and was therefore not considered an undue incentive. The incentive was considered a benefit to the participants as well as the opportunity to improve scientific knowledge and the chance to learn something about oneself through participation.

## **7.10 Ethical considerations**

All participants were read an informed consent form in which they signed and dated on agreement to participate in the study (See Appendix A). This formal agreement stated that no person other than the researcher and the supervisor would be allowed access to confidential information without prior consent of participants. The participants were made aware via the informed consent and the researcher that participation was voluntary and that they would be allowed to withdraw at any time without giving a reason. The informed consent indicated that the results of the tests will be analysed for psychological research and the results may be presented at conferences and published in books and journals. It was highlighted that the format of the results will provide details of participants in other words the results will be anonymous. The data will be stored indefinitely by the investigator and will be accessed by other people working on the project, but personal information will be withheld. The participants were made aware that the informed consent forms with their name on will be stored separately and will be shredded once they are no longer required (after five years) They were made aware that once the raw data were no longer required all the personal details would be eradicated. It was also stated that no form of harm would be inflicted on the participants and no costs would be incurred. The participants were also provided with contact details of the research supervisor, supervisor and an additional researcher which was included in the informed consent but excluded in the example in Appendix A.

### **7.10.1 Stressful or upsetting procedures**

Stimuli, tasks or procedures which may have been experienced as stressful, noxious, or unpleasant were used in the study. In the stereotype threat condition the science group were assigned to a low status group in which negative group stereotypes are activated related to their faculty membership. While this is preferable to designs that draw on much more important and

overwhelming social stereotypes such as race, it does result in some participants experiencing an unpleasant situation. Additionally, students in the intergroup hostility condition may be stressed by the simulated conflict between Science and Humanities students. However since research has shown that knowing about the stereotype threat prevents it from occurring all the participants were debriefed prior to leaving the experiment (Johns, Schmader, & Martens, 2005). The participant also had access to support from using the contact details of an additional researcher on the informed consent.

### **7.10.2 Deception**

In addition a minor deception was used on several accounts during the sampling and data collection procedure of this study. The study description provided in the informed consent and instructions to the symbols and numbers tasks used minor distortions to tailor the description to match their group category and experimental condition (stereotype threat or stereotype lift). Additionally, to avoid introducing confounding demand characteristics, participants will not be informed that the study is really only interested in differences in the dependent variable on the basis of group-based experimental manipulations (i.e. STL).

These stressors and deceptions were necessary to the design of the study and are justified by the importance of understanding stereotype threat for our understanding of the underperformance of minority group members in all important social settings, including education and the workplace. To minimize harmful consequences, participants were informed during the informed consent procedure that they “may be exposed to some unpleasant information” and they would be fully debriefed after the experiment. The concept of stereotype threat and the details of the experimental design were explained to participants by the researcher during debriefing and they were given strategies for identifying and resisting the ST in their everyday lives. Such knowledge has been shown to provide some protection from the stereotype threat (Johns et al., 2002). Participants will also be given a debriefing document (see Appendix F) to take away with them detailing the strategies for resisting stereotype threat that have been identified to date. It was recommended that participants focus on positive group identities or super-ordinate group membership instead of the stereotyped group membership. One of the most

relevant recommendations provided in this study was that demotivation results from increased stress due to feeling stereotypically threatened and not from the task itself.

It was offered that their personal result on the APM would be emailed email if desired. In addition the participants were provided with information that they will be remunerated according to the results of the simulated intergroup distribution task when, in fact, they all received the same incentive at the end of the study.

## Chapter Eight: Results

### 8.1 Demographics

One hundred and twenty two students ( $N=122$ ) that were enrolled in the faculty of science participated in this project. Twenty-two (18%) students were studying Agriculture, 3 (2%) students were studying Biochemistry, 34 (28%) students were studying a General Bachelor of Science degree, 11 (9%) of the students were studying Chemistry, 7% (8/122) students were studying Computer science, 1 (1%) students were studying computational physics, 11 (9%) students were studying Ecology, 12 (9%) students were studying Microbiology, 3 (2%) students were studying Genetics, 5 (4%) students were studying Geography, 10 (8%) students were studying Dietetics and 2 (2%) students did not indicate the type of course they were enrolled for. The students were in the age range of between and including 20 years to 30 years of age with an average of 23 years of age.

In addition 90 students (73.8%) indicated that they were Black South African, 11 (9%) were White, 11 (9%) were Indian and 6 (4.9%) were Coloured, 110 (94.8%) participants indicated that they were South African and 6 (5.2%) described themselves as “other.” Altogether one hundred and nineteen students indicated their gender, fifty-three students (43.4%) were female and 66 (54.1 %) were male.

The sample of 122 participants consisted of 58 participants in the low conflict condition and 64 participants in the high conflict condition. From the 64 participants in the high conflict condition, 22 participants are in the threat condition and 24 participants are in the lift condition and 18 participants are in the control condition. From the 58 participants in the low conflict condition, 14 participants were in the threat condition, 12 participants were in the lift condition and 32 participants are in the control condition.

*Table 8.1.**Table of count for manipulations*

| Status condition | Conflict condition  |                      | Total |
|------------------|---------------------|----------------------|-------|
|                  | <u>Low conflict</u> | <u>High conflict</u> |       |
| Threat           | 14                  | 22                   | 36    |
| Lift             | 12                  | 24                   | 36    |
| Control          | 32                  | 18                   | 50    |
| Total            | 58                  | 64                   | 122   |

## 8.2 Scale Reliability Analysis

For maximum internal consistency a scale should have a Cronbach's alpha close to one and according to (Finchilescu, 2002) the general rule for internal consistency is a reliability coefficient of greater than 0.75. However, Hair, Black, Babin and Anderson (2006) in chapter three argue that the agreed lower limit of acceptability in internal consistency on a scale is 0.7 and may decrease to 0.6 in exploratory research. However the authors urge researchers to acknowledge that larger scales with more items are required to increase the scale reliability (Finchilescu, 2002). To guard against being too lenient or too stringent a reliability coefficient of 0.65 was used as a cutoff to determine internal consistency in this study. Aiken (1982) in Hair et al., (2006) suggests that a reliability coefficient of 0.65 be used when comparing groups of people. Research has shown that shorter scales often have reliability coefficients closer to 0.6 and 0.7 and by increasing the size of the scale such that there are more than ten items the reliability coefficient increases incrementally (Hair, et al., 2006). Indeed the scale reliability for the stereotype agreement and the conflict manipulation checks were extremely low since the scale has six items and four items respectively. Although they were below 0.65 they were not omitted as they form an integral part of the design instead the items with the least internal consistency were deleted.

### **8.2.1 Stereotype threat and lift manipulation check**

The Cronbach's alpha for the stereotype agreement manipulation check is .176 ( $\alpha = .176$ ) for the six items. This is an unacceptable reliability. The items 5 and 6 were dropped to improve the internal consistency of the now 5 item scale to .559.

### **8.2.2 Conflict**

The Cronbach's alpha is .581 ( $\alpha = .581$ ) for the four items which is below .65. It is clear that this scale was not successful in manipulating perceived intergroup conflict. However the Cronbach's alpha is improved to .769 if item 1 is dropped from the scale leaving the final scale a small yet more reliable scale consisting of 3 items.

### **8.2.3 Conflict manipulation check**

An independent samples *t* test was undertaken with conflict measure as the test variable and the conflict condition as the grouping variable. The manipulation check for conflict shows that the perceived conflict is not significantly different in high and low conflict conditions:  $t(119) = .576, p > 0.05$ , one-tailed,  $d = 0.20$ . This test indicates that the conflict manipulation ( $M = .483; SD = .172$ ) may have not been an effective manipulator of conflict and cooperation ( $M = .525; SD = .501$ ).

Oswald and Harvey (2000) illustrate that negative stimuli interact differently with the stereotype threat and stereotype control. We have therefore reasoned that the conflict manipulation may work differently for participants in the threat, lift and control conditions. In order to test for this a one way ANOVA was conducted with the conflict measure as the dependent variable and the status condition as the independent variable. The Levenes test indicates that the error variance of conflict is equal across all groups and the ANOVA can be interpreted:  $F(2; 118) = 1.476, p = .232$ . The one-way ANOVA illustrated that the conflict manipulation ( $M = .483; SD = .172$ ) significant effect on the status control ( $M = .383; SD = .192$ ), lift ( $M = .401; SD = .168$ ) and threat ( $M = .483; SD = .172$ ):  $F(2; 118), p = .082$ . A bar chart of as constructed to explore this; the dependent variable was the APM performance and the independent variable was the status condition and the data was clusted in terms of high and low conflict.

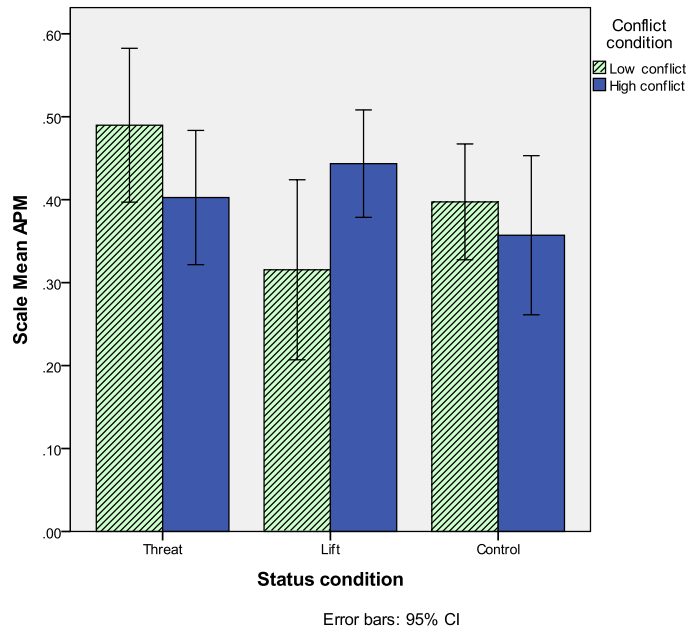


Figure 8.1. Bar chart showing the difference that conflict has on APM test performance for stereotype threat, lift and control conditions

Although the confidence intervals in the bar chart is overlapping, the chart illustrates that the conflict manipulation may affect the performance of the participant's in each of the status conditions such that those participant's in the threat ( $M=1.972$ ;  $SD =.881$ ) and control ( $M=2.116$ ;  $SD=1.053$ ) status conditions perform higher on the APM under conditions of low conflict and the participant's in the lift ( $M = 1.657$ ;  $SD =.786$ ) conditions of high conflict.

### 8.2.4 Reliability of the Social Identity Inventory

The internal consistency of the items in the subscales of the social identity inventory was calculated (see Appendix G). The subscales that measured the following factors were above the reliability coefficient of .65: In-group identifiability ( $\alpha=.700$ ), effort ( $\alpha=.738$ ), group differentiation ( $\alpha=.662$ ), out-group homogeneity ( $\alpha=.705$ ) symbolic threat ( $\alpha=.670$ ) and category salience ( $\alpha=.822$ ). The items of other subscales contributed to a moderate internal consistency such as individual identifiability ( $\alpha=.607$ ), in-group homogeneity ( $\alpha=.627$ ) and legitimacy ( $\alpha=.627$ ). The remainder of the subscales had an extremely low Cronbach's alpha and were not reliable measures of social identity.

### **8.2.5 Reliability of the dependent measure: Raven's Advanced Progressive Matrices**

The internal consistency among the 14 items of the short form of the Raven's Advanced Progressive Matrices subscale is below .65 ( $\alpha = .629$ ) Thus the answers obtained from the APM must be interpreted with caution. However the Raven's Advanced Progressive Matrices are not used in the usual sense to measure IQ. Instead the APM is used as a measure of task performance to ascertain the difference that combinations of conflict and status conditions on the participants. Another factor to consider is the skewing effects that stereotype threat has on individuals. Stereotype threat affects individuals when the items are most difficult. Thus it is possible to use the data obtained from APM as the scale affects participants at different levels of threat lift and control. The skewness and kurtosis is between -2 and 2 indicating that the APM data ( $M = .404$ ;  $SD = .181$ ) is more or less normally distributed.

The inferential statistics for the participants APM scores are enclosed in Appendix I.

The Pearson Bivariate correlation was used to determine if the the SILS could be used as a valid estimate of prior ability that correlates with the post manipulation APM. The SILS and the APM significantly correlated,  $r(120) = .441, p < .05$ . The inferential statistics for the participants SILS scores are enclosed in Appendix H. The significant strong positive correlation indicates that the SILS probably measures a similar underlying construct as the APM.

### **8.3 Testing the change in status and conflict on APM performance**

The results from Seunanden (2008) indicated that an independent pre-manipulation baseline measure of performance needed to be included in the study design, to isolate the effect of the status and conflict manipulation on APM. SILS has been used as a valid estimate of prior ability in environments where the SAT results used by Americans (Motuba, 2009) and was included in the design to control for pre-existing differences and individual variation in performance and was tested to determine its covariance with the APM. To test for the assumptions of the ANOVA were met. The ANOVA indicated a significant interaction between the SILS with conflict and status and suggests that the differences on the APM among groups vary as a function of the SILS., Univariate ANOVA,  $F(55, 66) = 1.593, MSE = .026, p = .035$ .



As such the SILS was included as an independent pre-manipulation baseline measure that covaries with the APM to isolate the effect of the status and conflict manipulation on APM.

The effect of high and low conflict and control, lift and threat status on APM performance was tested using a Univariate factorial ANOVA. The dependent variable was the APM scores of the participants and the independent variable that was used was the conflict and the status conditions. The Levene's test indicated that the error variance of APM is equal across all groups and the ANOVA can be interpreted:  $F(5, 116) = 1.215, p = .306$ . The main effect of status on APM test performance was not significant,  $F(2, 116) = 1.733, p = .181$ . Control, threat and lift conditions did not differ on APM test performance. The main effect of conflict on APM test performance was not significant,  $F(1, 116) = 0.00, p = .000$  but there was a significant interaction between status and conflict indicated by the factorial ANOVA  $F(2, 116) = 3.354, MSE = .032, p = .038, \eta^2 = .055$ . Since the interaction was evident, the SILS baseline measure was not used to isolate the interaction effect of status and conflict on the post manipulation APM performance.

The within groups differences can be explained as follows; It is evident from the table of means and the bar chart above that the difference between high and low conflict in the lift condition is the highest, followed by the difference between high and low conflict in the threat condition and high and conflict in the control condition. The table of means (see Appendix J) indicates that the highest APM performing group is the low-conflict-threat group ( $M = .490; SD = .048$ ). Conversely the lowest APM performing group is the low-conflict-lift group ( $M = .315; SD = .051$ ). In both conditions of conflict the threat group performs higher than the control group.

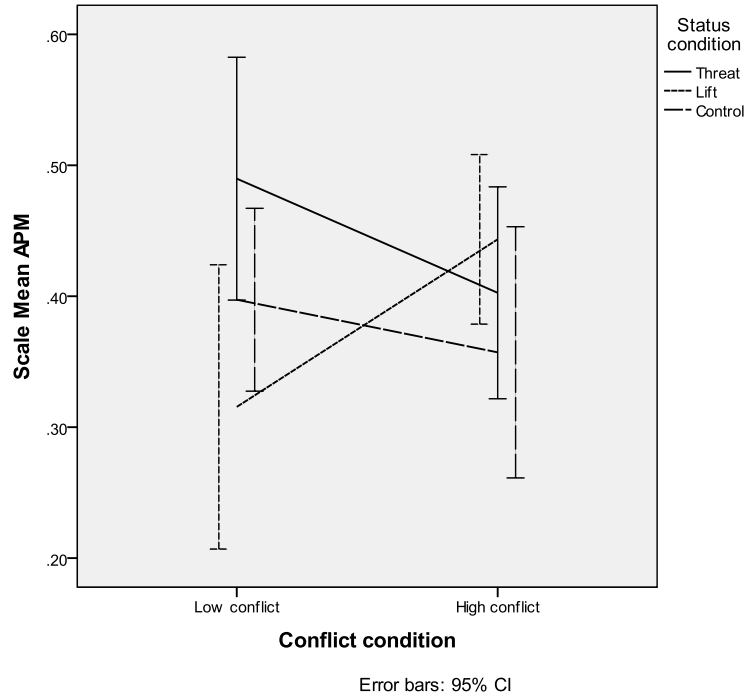


Figure 8.2. Conflict and status interaction effect with APM scores

The interaction effect is depicted in the graph which illustrates a higher APM test performance for the threat condition ( $M = .490$ ;  $SD = .048$ ) compared to the lift condition ( $M = .315$ ;  $SD = .051$ ) for the low conflict groups. In addition there is a higher APM test performance for the lift ( $M = .443$ ;  $SD = .036$ ) than the threat in the high conflict condition ( $M = .403$ ;  $SD = .038$ ). As such the graph depicts typical congruent stereotype threat and lifts performance effects for the high conflict group and atypical incongruent stereotype threat and lift performance effects for the low conflict group.

### 8.3.1 The influence of social identity variables on the status by conflict interaction

A multiple regression was run predicting each of the social identity variables, centred for the regression analysis, in turn from conflict, status and the conflict \* status interaction. The statistics for each of the significantly relevant variables were placed in the table below. The hierarchical linear regression models were computed to investigate whether the stability, group homogeneity or academic history interacted with the status by conflict conditions and were predictors of APM performance. Only the stability and in-group homogeneity social identity terms were significant in the model and will be discussed. Both of which interacted with the status

condition, to affect the APM test performance (see appendix K and L summary of regression for the variables stability and homogeneity). The assumptions of linearity and normal distributions were checked and met for both regressions. This calculation had a Familywise error rate of .0101.

The model of the stability interaction with status ( $M = 4.475, SD = 3.279$ ) significantly predicted APM test performance ( $M = .404, SD = .182$ ),  $F(3, 116) = 2.720, p = .048$ , adjusted  $R^2 = .053$ . Five percent of the variance in the APM test performance is explained by the stability interaction with status. The R value is .256 and according to Cohen (1988) this is a medium effect size. The unstandardized regression weights, presented in Table 9.2, indicate that when the stability and status interaction increases by one unit the APM test score decreases by .037 units,  $B = -.370, t(120) = 2.562, p = .012$ .

The model of the ingroup homogeneity interaction with status ( $M = 5.290, SD = 4.172$ ) significantly predicted APM performance ( $M = .405, SD = .182$ ),  $F(3, 117) = 2.701, p = .049$ , adjusted  $R^2 = .041$ . Four percent of the variance in the APM test performance is explained by the ingroup homogeneity interaction with status. The R value is .255 and according to Cohen (1988) this is a medium effect size. The unstandardized regression weights, presented in Table 9.2, indicate that when the stability and status interaction increases by one unit the APM test score decreases by .034 units,  $B = -.034, t(120) = 2.524, p = .013$ .

Table 8.2.

*Unstandardized regression weights for the stability regression model and the homogeneity regression model*

|              | Variable                      | <i>B</i> | <i>SEB</i> | $\beta$ |
|--------------|-------------------------------|----------|------------|---------|
| Regression 1 | Stability by status           | -.037    | .015       | -.672   |
|              | Constant                      | .448     | .036       |         |
| Regression 2 | Ingroup homogeneity by status | -.034    | .014       | -.791   |
|              | Constant                      | .441     | .035       |         |

Table 8.3.

*Social Identity Variables that influence the Status by Conflict Interaction on APM performance*

| Variable            | <i>M (SD)</i> | <i>df</i> |           | <i>F</i> | <i>p</i> |
|---------------------|---------------|-----------|-----------|----------|----------|
|                     |               | <i>LL</i> | <i>UL</i> |          |          |
| Academic history    | 3.410 (6.12)  | 1         | 118       | 5.208    | .024     |
| Ingroup homogeneity | 4.682 (.807)  | 1         | 118       | 6.004    | .016     |
| Stability           | 4.003 (.872)  | 1         | 117       | 5.498    | .021     |

Note. *LL* = lower limit, *UL* = upper limit

The results indicate that that academic history, in-group homogeneity and stability influence the status by conflict interaction and may change the direction of the APM test performance in significant ways (Familywise error rate of .014).

#### **8.4 Testing the gender by status by conflict interaction–performance relationship**

Post hoc analysis was conducted to determine the status by conflict interaction affected the APM test performance of the male and female participants in the same way. The influence of sex on the above status by conflict interaction on APM performance was tested using a Univariate ANOVA. The dependent variable was the APM scores of the participants and the independent variables that was used were the conflict and the status conditions and the sex of the participant. The Levenes test indicates that the error variance of APM is equal across all groups and the ANOVA can be interpreted:  $F(11, 107) = .993, p = .559$ . The main effect of status on APM test performance was not significant,  $F(2, 107) = 1.027, p = .362$ . Control, threat and lift conditions did not differ on APM test performance. The main effect of conflict on APM test performance was not significant,  $F(1, 107) = 0.005, p = .942$ . High (conflict) and low conflict (cooperation) did not differ on APM test performance. The main effect of the sex of the participant on APM test performance was not significant,  $F(2, 116) = .882, p = .350$ . However, there was a significant interaction between status, conflict and sex,  $F(2; 107) = 3.097, p = .049$  indicated by the factorial ANOVA,  $F(2, 107) = 3.097, MSE = .030, \eta^2 = .028, p = .049$ . This indicates that the status and conflict manipulation may be experienced differently by males and

female science students. A graph of simple effects patterns was computed to further understand this interaction.

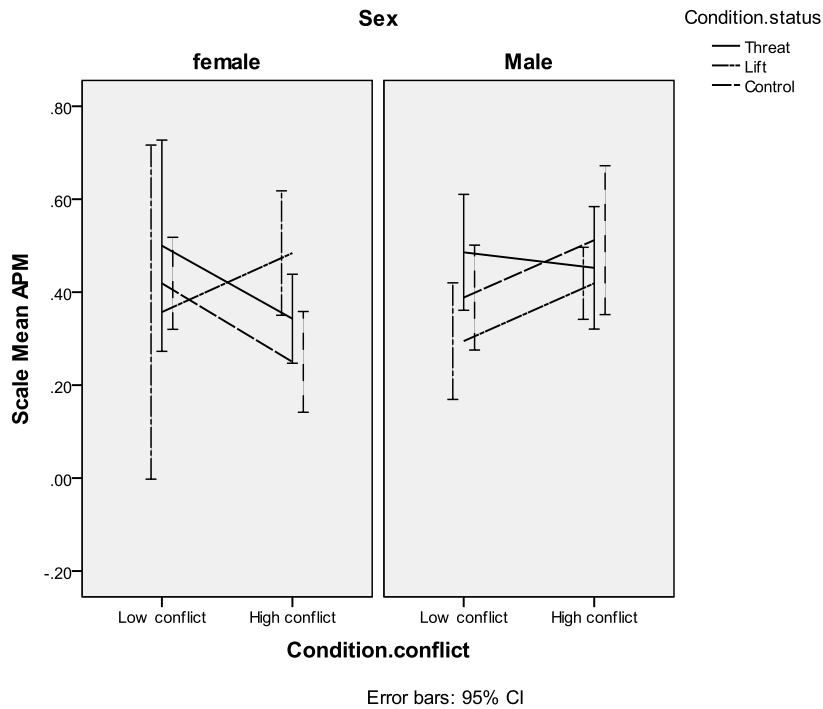


Figure 8.3 Conflict and status interaction for males and females

The highest APM performing group are males assigned to the high conflict-control condition. The lowest APM performing group is females assigned to the high conflict-control condition ( $M = .250$ ;  $SD = .152$ ) (See Appendix M). Males and females perform differently on the APM when assigned to conditions of high and low conflict. Typical congruent changes in STL performance, in which performance is poor under conditions of threat ( $M = .343$ ;  $SD = .134$ ) and high under conditions of lift ( $M = .484$ ;  $SD = .174$ ), are apparent for the females under conditions of high conflict.

Atypical incongruent changes in stereotype performance are apparent for males in both low and high conflict conditions whilst these changes are only apparent in males in low conflict. The males ( $M = .295$ ;  $SD = .150$ ) and females ( $M = .357$ ;  $SD = .225$ ), in the low conflict condition perform lowest on the APM test in the conditions of status lift. Females assigned to the control

condition females perform well under conditions of low conflict ( $M = .419$ ;  $SD = .178$ ) and males perform well under conditions of high conflict ( $M = .512$ ;  $SD = .152$ ).

The male ( $M = .295$   $SD = .150$ ) and female ( $M = .357$ ;  $SD = .226$ ) participants assigned to the low conflict-lift condition perform lower than males ( $M = .388$ ;  $SD = .211$ ) and females ( $M = .419$ ;  $SD = .179$ ) in the control condition respectively. The females assigned to the low conflict-threat condition ( $M = .500$ ;  $SD = .142$ ) outperform the female participants assigned to the low conflict lift condition ( $M = .357$ ;  $SD = .226$ ) and other female participants assigned to the low conflict control condition ( $M = .419$ ;  $SD = .179$ ). The same pattern of APM performance is present in males with participants in status threat performing higher than participants in status lift, however for group of males in high conflict condition the participants assigned to the status control ( $M = .511$   $SD = .152$ ) perform the highest and not intermediate to threat ( $M = .452$ ;  $SD = .207$ ) and lift ( $M = .419$ ;  $SD = .140$ ) conditions. The key difference between males and females, therefore, seems to be that females in the control condition responded to conflict with reduced performance while males responded with increased performance.

## Chapter Nine: Discussion

### 9.1 Summary of main findings

Conflict can be present in a variety of different contexts for competition for a range of resources and goals and has shown to result in in-group homogeneity and out-group denigration and stereotyping (Kenrich et al., 2009; Wetherell, 1996). Sherif and Sherif (1969) and Tajfel and Turner (1970) considered together illustrates that conflict may exacerbate intergroup categorization to create even more bias and discrimination. Perceived intergroup conflict was investigated as a macro level feature of identity that interacts with the salient stereotype to alter people's experience of a stereotype and their performance on the APM task. Other features of identity such as domain identification and in-group identification have been highlighted in ST literature.

In this study high and low levels of perceived intergroup conflict interacted with the salient stereotype about the cognitive ability of science students on test performance to affect the participants' APM test performance. In the control condition (when the group category was activated without positive or negative stereotype) the influence of conflict on performance (although not significant) was higher in the low conflict (cooperative) condition and lower in the high conflict (conflictual) condition. This suggests that the students experienced high and low levels of conflict differently in the experimental context. However when positive or negative stereotypes (stereotype lift or threat, respectively) were invoked, conflict interacted with status of the stereotype to result in different pattern of APM performance in each of the status conditions. In addition to congruent pattern of performance previously observed in stereotype threat and lift research whereby the valence of the stereotype is congruent with the direction of the shift in test performance (discussed further below), incongruent changes in performance associated with STL were also present. These incongruent patterns of performance were found when a salient positive stereotype decreased test performance (lift- low conflict) and a negative stereotype increased test performance in all the participants that received low conflict (cooperative) (threat- low conflict) feedback from the virtual out-group in the testing environment. The finding that participant's in the stereotype-threat-low conflict condition have an increased test performance

supports the view that stereotype threat cannot be a cognitive state that is chronically available in the personality of the group member who belongs to a low status or stigmatized group (Crocker et al., 1997). These results highlight the importance of conflict as a macro-level feature of social identity that deserves more attention in stereotype threat research.

## **9.2 The conflict and status interaction**

In this study conflict and status did not have an additive effect on test performance. Although conflict has been shown to increase category salience, and perceptions of intergroup differentiation the perceived intergroup conflict was not limited to enhancing the stereotype threat underperformance (Tajfel & Turner, 1979). Instead, perceived intergroup conflict interacted with status to modify performance differently under negative or positive stereotypes. These findings are similar to Oswald and Harvey's (2000) study which found that stereotype threat significantly interacts with hostile environments to reverse the direction of test performance. Oswald and Harvey (2000) found that the number of math problems answered correctly was higher under stereotype threat conditions when the context was hostile and challenging. It seems clear that intergroup conflict that changes the way ST is experienced or expressed however it is unclear if perceived inter-group conflict acts as an independent variable, moderating variable or a mediator in the stereotype performance relationship.

## **9.3 Incongruent increase in test performance for low conflict participants under threat**

The participants that were in the negative stereotype condition (stereotype threat) that received cooperative feedback (low conflict) from the out-group performed higher on the APM compared to the participants that were given the same type of feedback but told that the APM was purely a measure of degree success (stereotype control condition). These results have been referred to as reactance which may occur as a result of explicit endorsement of negative gender stereotypes which spurs increased performance (Kray et al., 2001). Previously reactance which has been shown to occur when a stereotype is explicitly (rather than implicitly or subtly) activated (Kray et al., 2001). This explicit reactance against the negative stereotype has been previously reported by Seunanden (2008) who described the "I'll show them effect" as a possible strategy for high performing science students experiencing stereotype threat in conflictual



conditions (high conflict). However the current project indicates that that favorable, less competitive and noble feedback (low conflict/cooperative condition) from the out-group also interacts with the science students' experience of the stereotype to motivate the group members to perform well.

However, while Oswald and Harvey's (2000) found increased test performance in conditions of stereotype threat and hostile environments the current study found that low conflict may also improve test performance. To understand these conflicting results it is important to take note that of the nature of the instructions for this project which differed from that of Oswald and Harvey (2000). Oswald and Harvey (ibid.) used (1) categories with deeply entrenched status differences in the domain (males and females in mathematics) and (2) a control group in which the negative stereotype was explicitly negated and the test was presented as non-diagnostic. The science students in this study are not normally considered at risk to be negatively stereotyped. In contrast to social groups such as the elderly and blacks, there are no serious negative stereotypes directly targeting the science students (except for the stereotype of "geeks" or "nerds" which actually have some positive connotations). A positive stereotype about science students compared to humanities students may be ubiquitous. Science students therefore are comparable to white men in Aronson and colleagues' (1999) study who are generally positively stereotyped *in general* even though they were subject to stereotype threat in the specific context of the experiment. As such it is possible that participants may not have agreed with the negative stereotype about the poor cognitive ability of science students and the lowered chances of post degree success. In the present study the test instructions did not represent non-diagnosticsity and – instead of explicitly negating a stereotype – the stereotype was simply not invoked. In this study, the perceptions of the out-group (humanities students) are not considered stereotypically superior. In addition the cooperative feedback from the humanities group may have created doubt on the genuineness of the negative stereotype which motivated the participants to perform well.

#### **9.4 Incongruent decrease in test performance for participants in the low conflict lift condition**

Participants that received test instructions that the science students have the cognitive skills suited to the demands of the APM and experienced cooperative interactions with the virtual out-group displayed decreased performance on the APM. Although the results were not expected as they were not in the predicted pattern (increased test performance during SL), the pattern of decreased test performance when positive stereotypes are explicitly activated has been previously reviewed by Cheryan and Bodenhausen, (2000). It is possible that the “choking under pressure,” type effect may help understand the decrease in test performance of participants in the low conflict lift condition. Researchers of this phenomenon reasoned that the mechanism behind the ironic increase is that positive stereotype activation is increased anxiety and disruptions in regulatory focus (Keller & Bess; 2008; 2007). However this ironic performance effect could possibly be explained by other socio-structural variables, namely stability which is discussed in the section on “going back to social identity theory” below.

It can also be argued that for participants in this study the uncompetitive nature of the conflict manipulation which facilitates harmonious intergroup relationships may have reassured the superior status of the science students in the positive stereotype to create an explicitly positive predicament whereby the participants have no identity-related motivations to perform well. Although not investigated in this study, similar results were found in Seunanden (2008) when science students that operate at their lowest level of potential and may be regarded as the group members with the least motivation to perform well and may have resorted to social loafing type behaviour in which they relinquish the responsibility to the higher achievers to represent the group by performing well. However the findings of this study were not further investigated with regard to this as the pre-manipulation measure of performance could not be investigated as a covariate in the status and conflict interaction.

The aforementioned typical patterns of performance are congruent with the findings in Seunanden (2008) where reversals of the stereotype threat and lift changes in performance were seen at different levels of performance. Although the design of the present study included the SILS as an independent pre-manipulation measure of performance to allow for the STL by

conflict interaction to be assessed at different levels of ability, the interaction effect observed in Seunanden (2008) was evident in this study without the use of the SILS as a pre-manipulation of performance to control for and isolate the effect for this sample of science students.

### **9.5 Studying stereotype threat in real world contexts**

Research has alluded to the definition of stereotype threat as a cognitive state that is responsible for the academic achievement gap between disadvantaged groups and the superior groups for example women and men in the math domain. It can be argued that stereotype threat research has traditionally focused on examining the changes or differences in performance associated with stereotype performance using individualistic frameworks and variables that fail to account for the agency of the target experiencing the threat or the full range of factors impact on the identity of the target in contexts in which test performance is assessed.

This study differed from the study design of Oswald and Harvey (2000) in three ways. Firstly, the design of the study included “positive” and “negative” conditions which facilitated both cooperative (low conflict) and conflictual (high conflict) intergroup interactions. The participants in this study completed a simulated computer task in which feedback of the out-group’s allocation strategies on Tajfel’s (1981) matrices was provided; cooperative feedback was depicted when the out-group allocated more points to the participants referred to as the low conflict condition and the high conflict condition when the out-group allocated less points to the participants which was referred to as the. The design adopts a holistic approach by considering the socio-structural features in the environment that encourage less hostile, more harmonious and cooperative interactions. Although the design of this project can be critiqued for its weakness in not including a conflict control condition, as did Oswald and Harvey (2000), the research project provides the opportunity to study the impact of conflict in its entirety as it exists in society.

Secondly the participants in the in-group were active in choosing their response to the conflictual or cooperative feedback received from the out-group. Unlike the female students in Oswald and Harvey’s (2000) experiment who were primed by the passive hostile stimuli of a cartoon that was derogatory to females which was hang on the wall, the science students were active participants responding to an interactive and realistic” simulation of actual social conflict.

This allowed the participants to actively respond to the stimulus by deliberating on their response with two other people that belonged to their social category.

Thirdly, although in some instances research has examined the performance effect associated with a positive stereotype (eg. Aronson et al., 1999; Shih, Pittinsky & Ambady, 1999), stereotype threat and stereotype lift have generally been treated as separate phenomena and studied independently. In contrast to the majority of prior studies, this study investigates ST and SL collectively by manipulating the valence of the stereotype both negatively and positively to produce the conditions for ST and SL to occur in the same environment. In comparison, Oswald and Harvey (2000) have investigated stereotype threat but not stereotype lift in their study. Together with other researchers they have placed emphasis on the controversial unidirectional stereotype threat underperformance referred to as stereotype threat. Following Haslam and colleagues (2008), the present study conceptualizes STL as interdependent phenomenon belonging to the same process of events to result in a change in performance. By considering both stereotype threat and lift, this project enables an understanding of the underperformance or decline in performance associated with stereotype threat as a type of behavior change in human beings that occurs in response to variables in the social context.

## **9.6 Toward a non-deterministic model of stereotype threat theory**

The results suggest that stereotype threat does not always result in a decrease in test performance and stereotype lift does not always result in an increase in test performance. This performance in the participants assigned to the low conflict and low status condition provides evidence that the conflict and stereotype status interact to disrupts the deterministic link between the negative stereotype and performance decrease. An extra-ordinary finding is that the target may experience a decline in test performance when made aware of a positive stereotype about their group ability when conflict is low (low conflict-stereotype lift conditions). Both these differences in performance reflect incongruent changes associated with STL which allows one to argue that the valence of the stereotype cannot be used to predict the direction of the performance shift. This research helps understand the stereotype threat performance relationship by revealing conditions in which incongruent changes in performance associated with STL can arise. The incongruent changes in performance associated with STL have not been adequately

considered in stereotype threat literature (eg. Aronson et al., 1999; Shih et al., 1999) and the stereotype threat performance relationship and has not been given sufficient attention.

The stereotype threat performance relationship can only be understood by interpreting the interaction of the conflict and status manipulation. The findings can be used to understand how alterations in the features of the socio structural context can affect the nature of the stereotype; the stereotype, context and identity are aspects that affect the stereotype performance relationship. The results of the present study support prior research conducted by Seunanden (2008) and other hints from the literature which illustrate the incongruent atypical stereotype threat performance effects. This project demonstrates that a decline in test performance is not the only possible outcome to stereotype threat and that stereotype threat underperformance associated with stereotype threat can, in some situations at least, be counteracted and reversed by varying the level of conflict in the testing context of a stereotyped student. However this may not be advisable since altering the competitive nature of group members that are stereotypically more likely to attain a scarce resource (high status group) may provide an advantage to negatively stereotyped individuals (low status group) whilst changing the attitudes of the competitive individuals which may have worked hard to attain the resource (group leaders in the high status group). One can garner an understanding of how adopting policies in this regard is unethical in terms human rights to equality and access to resources. In addition there are limitations to manipulating conflict in high stakes testing, as manipulating conflict among individuals who compete with each other for scarce resources may soon result in intergroup competition. As such individuals that are members of a group in the testing environment may soon perform as part of the group. Therefore the valence of a stereotype cannot be used to predict the direction of a performance effect in isolation. The findings acknowledge that the stereotype threat performance model may be a much more complicated model of behaviour and that socio-structural variables suggested by SIT, such as conflict, require further consideration.

### **9.7 Socio structural variables and conflict**

Conflict together with other features of social structure such as permeability of group boundaries, the stability of group statuses and legitimacy influence how people perceive their intergroup relations and make intergroup evaluations and group categorizations (Ellemers et al.,

2002; 1993). As such an increase or decrease in test performance can be understood as possible responses to stereotypes and socio structural stimuli in the environment. This suggests that the participants' test performance score cannot be a measure of a cognitive state, which is how stereotype has been traditionally defined since test performance cannot be understood in isolation from the very testing context in which it occurs.

Research conducted in stereotype threat literature has aimed to determine the effect of variables such as anxiety, stigma consciousness and performance expectancies that measure internal attributions of stereotype threat. Since the phenomenon was identified the field has mapped out a number of individual-level variables that make an individual more susceptible to stereotype threat, but researchers have been largely unsuccessful in determining which variables work together to form a causative model of underperformance. In addition the overlapping roles of the variables such as effort create more confusion and no single variable or model can so far explain how a cognitive state cause changes in student test performance omitting the role of social variables that are external to the “target”

Steele (1997; 2010) has successfully pointed out that a person's identity in a performance context and social features of that context combine to affect intellectual functioning. The findings of the present study highlight the importance of investigating the influence of socio-structural variables, present in the testing environment of the “target”, on test performance in conditions of stereotype lift and threat. Interventions that alter the level of conflict in the environment can change the experience of a stereotype providing a hopeful insight that improvements to the underperformance of low status groups typically associated with stereotype threat can be made aside from interventions aimed to alter the cognitive state of the “target”..

In addition to changing their approach to create a warm and supportive environment that is conducive to learning (Oswald & Harvey, 2000), educators should monitor the intergroup relationships within the environment such that hostile intergroup behaviour is not the norm. Teachers should be advised to pay careful attention to their attitudes and responses to certain learners such that they do not create an atmosphere that facilitates intergroup competition and hostility. This highlights the importance of a learning atmosphere that acknowledges all the

students' abilities and potential. In addition it can be advised that educators be cautious during group tasks and encouraged to divide students into groups on the basis of socially innocuous categories for each new task, by example by the act of drawing a number out of a hat. In addition the teachers' challenge is to alter the environment such that in the face of a negative ubiquitous stereotype the members that are in powerful status groups that are stereotyped as more likely to obtain a scarce resource maintain harmonious and cooperative intergroup relationships. This can be done by creating a superordinate task that does not require intergroup competition that is mandatory for opposing group members to participate.

### **9.8 Going back to social identity theory**

The variables in-group homogeneity and stability that were included in the social identity inventory were found to interact with the status manipulation to alter test performance on the APM. In an environment of high conflict and a negative stereotype, the participants' belief that they are more similar to other science group members interacts with the threatening stereotype to enhance its effect and decrease test performance. The participants that felt more similar to the science students performed poorly on the APM when a negative stereotype about their group membership was made salient and the stimulus indicated bias toward the science group. This highlights that participants who believed that the science students were a relatively homogenous group were more inclined to perform poorly. This is similar to the "diffusion of responsibility" type effect (Wallach, Kogan & Bem, 1964), common to social psychology, whereby these group members that feel that they are lower status because they do not stand out, may assume that other group members will take action to perform against the negative stereotype and maintain the group esteem. Further research needs to be conducted to determine which of the other social identity variables may influence how a negative stereotype can be perceived differently when group members know they are competing for a scarce resource.

SIT argues that group membership, feelings and beliefs about the in-group impacts on how people perceive themselves and others around them and influences people's behavior as group members (Ellemers et al., 2002; 1993). By acknowledging that intergroup behavior is different from individual behavior, and group members may develop concerns about their group image, and respond as a group member (Wetherell, 1996) we may be able to better understand

the changes in performance associated with STL. Since the membership of a science student is stable and the group boundaries are permeable this may affect the coping strategies the students use to deal with the threat of losing their status (Ellemers, et al., 2002; Wetherell, 1996).

In addition to conflict, status stability may also be responsible for altering the participants' experience of the salient stereotype. In an environment of conflict and a negative stereotype, the participants' belief in the stability of the science group in relation to the humanities groups decreases test performance by interacting with how they perceive the salient stereotype. For example the performance of participants in the threat condition feel committed to their group when they perceive that the status hierarchy with the outgroup is not amenable to change and therefore try to achieve a better position for their group (cf. Ellemers, Wilke & Van Knippenburg, 1993 in Ellemers et al., 1999) this could be a possible explanation for the participants in the low conflict-threat condition These variables seem to have an influence on the student's experience of STL and should be considered in further research on social identity variables and socio-structural variables in stereotype threat research.

Performance can be interpreted as a strategic response to a salient stereotype in the specific social environment of the participant, of which perceived intergroup conflict is an important part. However, people's behavior has a different social meaning depending on the social situation (Reicher, 1996). Just as the crowds in the "St. Pauls riot" senseless celebration revealed their strategy for social change and redefinition with the outgroup so too can performance have a social meaning in response to the variables such as conflict that are present in the social structure (Reicher, 1996). Test performance can only be understood upon a closer analysis of the social identity and socio structural variables that are present in the testing environments since people are active agents that respond to threats to their identities in deliberate ways (Ellemers, & Van Rijswijk, 1997)

Early SIT research highlights that the group members behave in strategically in deliberate ways according to variables in their social structure (Ellemers et al., 2002; 1993). SIT provides a holistic understanding of the behaviour of people whose identity is perceived to be threatened and how they position their identities in the social context. Haslam and colleagues (2008) focus



on the self and the social identity when explaining stereotype threat and offer a more situational approach to understanding behaviour. SIT may offer a more generalized yet more thorough understanding of test performance in conditions of stereotype threat. SIT provides the aforementioned approach to performance which explains that changes in performance are one of the behaviors in response to the contingencies that create a threatening situation.

### **9.9 Stereotype threat and lift, and gender**

Although it was included only as a post hoc feature in the analysis of the present study, the empirical effect of stereotype threat on test performance of females is apparent in many studies (Spencer et al., 1999; Spencer, Quinn & Spencer, 2001; Shih, Pittinsky & Ambady, 1999). The findings suggest that the stereotype about the gender may have been implicitly activated alongside the “science student” identity since women tend to be marginal and non-prototypical members of that group and their identity as women may be pervasively accessible alongside their identity as science students (Fox, 2001). In other words, it could be argued that the stereotype about low math, science and engineering ability in women compared to men is a pervasive aspect of society (Steele et al., 2002b). The instructions which presented the APM was presented as a diagnostic test which measured differences in cognitive ability (eg. Croizet & Claire, 1998; Steele & Aronson, 1995; Stone et al., 1999), and this may have presented the test as diagnostic enough to make the sex category of the participants salient and invoke gender-related stereotype threat (Steele et al., 2002). Although this argument is insightful it may be argued as implausible since the gender activation was post manipulation and the items in the test responsible for activating this social category was placed at the end of the testing material (See appendix G).

Alternatively, gender differences could have been due to gender-related differences in responses to conflict. The post-hoc analysis reveals that females in the control condition responded to conflict with reduced performance while males responded with increased performance highlighting the different ways that men and women have become socialised to respond to conflict. Status and conflict interact with the gender of the participants to affect the APM test performance of males and females differently. In conditions of low conflict and perceived cooperative intergroup relations both male and females perform higher when a

negative stereotype is made salient and perform lower when a positive stereotype is made salient. This incongruent pattern of performance has been discussed in the aforementioned sections on the incongruent increase and decrease in test performance for participants in the low conflict.

However the female science students were found to have congruent changes in performance associated with stereotype threat in conditions of high conflict. In conditions of high conflict males and females experience very different changes in performance— females perform lower in conditions in which a negative stereotype is made salient compared to conditions in which a positive stereotype was made salient, whilst males perform higher in the conditions in which a negative stereotype is made salient. This finding is congruent to the majority of studies that show that stereotype threat reduces the performance of female in male dominated math domain (Nyugen & Ryan, 2008). Although this is contrary to Oswald and Harvey's (2000) results that women's math performance can *increase* when there is conflict or a negative stimuli in the testing context of the “target”, as previously highlighted the nature of the “conflict” manipulation is more realistic. It is evident that intergroup conflict interacts with the valence of the stereotype and gender identity influence the “target's” experience of a stereotype.

Previous research has suggested that males tend to be more aggressive toward others in conditions of conflict, and it could be that the males engaged with the conflict when they were threatened with a negative stereotype and challenged it with improved APM performance. In contrast, the traditional role of a female is to be passive toward others and avoid conflict, and this pattern of behavior may be evident in decreases in performance for women in the high-conflict threat condition. More simplistically, females are socialized in stereotypically feminine roles in society and experience situations of high conflict differently and perform according to their experience. These findings are supported in the early findings of traditional male and female gender roles in Reinsch and Sanders (1896) and Eagly (1982). This suggests that our response to conflictual and cooperative stimuli and stereotypes in the environment may be influenced by the daily roles that we have as men and women in society and proposes interventions that are sensitive to the features of gender identity in academic settings. However further research must be conducted to explore the role of the features of gender identity in the intergroup conflict – stereotype interaction by manipulating gender as an *a priori* variable in the experimental design.

## **9.10 Limitations**

The following limitations of the study were observed and discussed as follows:

### **9.10.1 Lack of a control for the conflict manipulation**

It can be argued that by not including a conflict control manipulation in the design the discussion of the findings may be constrained. It can be argued that the sample size ( $N=122$ ) may have been too small to study the differences between the six groups however this was due to time constraints and oversampling of the student population.

### **9.10.2 Low reliabilities of scales**

The reliabilities of the following scales are noted as they highlight that the empirical data should be interpreted with caution.

#### ***9.10.2.1. Stereotype threat and lift manipulation check***

The Cronbach's alpha for the 5-item stereotype agreement manipulation check scale is .559. The low internal consistency of the scale suggests that its reliability in determining stereotype agreement manipulation is low and should be interpreted with caution.

#### ***9.10.2.2. Conflict***

The Cronbach's alpha is .581 ( $\alpha=.581$ ) for the four items which is below .65. The Cronbach's alpha is improved to .769 if item 1 is dropped from the scale leaving the final scale a small yet more reliable scale consisting of 3 items. However one may question the length of the three item scale in manipulating perceived intergroup conflict. The scale should be interpreted with caution and not without considering the scale that checks for the conflict manipulation.

#### ***9.10.2.3. Conflict manipulation check***

An independent samples  $t$  test was undertaken with conflict measure as the test variable and the conflict condition as the grouping variable. This showed that perceived conflict is not significantly different in high and low conflict conditions:  $t(119) = .576, p > 0.05$ , one-tailed,  $d = 0.20$ . This highlights that the manipulation for conflict was not successful. Supported by

Oswald and Harvey (2000) we have reasoned that that negative stimuli interact differently with the stereotype and that the conflict manipulation may work differently for participants in the threat, lift and control conditions. It can be argued that this scale was not a reliable manipulation check (.559) as it may have been perceived differently for participants assigned to each stereotype status condition, and thereby failed to detect perceived intergroup conflict.

#### ***9.10.2.4. Reliability of the Social Identity Inventory***

The subscales that measured the following factors in the following subscales contributed to a moderate internal consistency such as individual identifiability ( $\alpha=.607$ ), in-group homogeneity ( $\alpha=.627$ ) and legitimacy ( $\alpha=.627$ ) and the remainder of the subscales as indicated in appendix G, have low Cronbach's alpha and were not reliable measures of social identity. Each subscale should be interpreted with caution.

#### ***9.10.2.5. Reliability of the dependent measure: Raven's Advanced Progressive Matrices***

The internal consistency among the 14 items of the short form of the Raven's Advanced Progressive Matrices subscale is below .65 ( $\alpha=.629$ ). However the Raven's Advanced Progressive Matrices are not used in the usual sense to measure IQ. Instead the APM is used as a measure of task performance to ascertain the difference that combinations of conflict and status conditions on the participants.

### **9.10.3 Use of the SILS to test the change in status and conflict on APM performance**

The results from Seunanden (2008) indicated that an independent pre-manipulation baseline measure of performance needed to be included in the study design, to isolate the effect of the status and conflict manipulation on APM. Although the ANOVA indicated a significant interaction between the SILS with conflict and status and suggested that the SILS was a reliable independent pre-manipulation baseline measure that covaries with the APM to isolate the effect of the status and conflict manipulation on APM, the significant interaction between status and conflict indicated by the factorial highlighted that the SILS baseline measure was not necessary to determine the interaction. As such SILS was included in the design but was not interpreted as it was not necessary to use the measure to isolate the interaction effect of status and conflict on the post manipulation APM performance.



## Chapter Ten: Conclusion

Previous research on stereotype threat and lift (STL) has focused on unidirectional changes in performance associated with STL and has failed to investigate key socio-structural features of social identity. The present study allowed the full range of changes in performance to be explored by manipulating high and low status (by invoking positive and negative stereotypes in different conditions) and explored the influence of conflict, a key socio-structural identity variable proposed by SIT, on STL performance. Intergroup conflict is a socio-structural variable present in social situations that invokes bias, discrimination and stereotyping. Without manipulating actual intergroup relations including a real out-group, this project provides evidence that intergroup conflict can be perceived by simulating perceptions of intergroup bias and discrimination. This highlights the potency of competitive intergroup interactions in seemingly individual test taking conditions (such as academic examinations) and indicates how such testing conditions can result in intergroup competition. This supports research on the influence of the socio-structural variables, more specifically perceived intergroup conflict in the academic testing context in facilitating high academic test performance for all students and adds to the research which highlights that subtle behaviors of educators, peers, teachers and lecturers in the academic environment can facilitate an atmosphere that is less threatening for students.

Although stereotype threat has been shown to be a pervasive element of society, hints from the literature and the results of the present study show that stereotype threat does not always reduce test performance and stereotype lift does not always increase it. The present study shows that when the testing environment invokes perceptions of conflictual intergroup relationships and the group identity of the students' are threatened may result in an improvement in their test performance. As such this provides evidence that the decline in performance or underperformance traditionally referred to as 'stereotype threat' may not always a chronic response to a negative stereotype as argued by Steele (2010). On the other hand, in the present study when the testing environment invoked perceptions of cooperative intergroup relationships and the group membership of the students were associated with a positive stereotype, the test performance of science students decreased. Therefore improvements in test performance are not

inevitable in testing conditions in which a positive stereotype is invoked. It seems clear that intergroup conflict that changes the way ST is experienced or expressed however it is unclear if perceived inter-group conflict acts as an independent variable, moderating variable or a mediator in the stereotype performance relationship.

The conditions of conflict interacted with group status to influence an individual group member's responses to positive or negative stereotypes and ultimately on how conditions of STL are experienced or expressed. . The pattern of performance present in the participants assigned to the low conflict condition provides evidence that the conflict and status interaction disrupts the deterministic link between the valence of the stereotype and the direction of performance. This suggests that the stereotype-performance relationship is a complex process that is influenced by social structural variables or macro-level features of identity such as conflict as described in SIT. Therefore the valence of a stereotype cannot be used to predict the direction of a performance in isolation. On the contrary, situational variables such as intergroup conflict (and possibly other social identity variables) interact with the valence of the stereotype and other features of identity (such as gender) to influence the "target's" experience of, and reaction to, a stereotype. Acknowledging the role of conflict in changing how a stereotype is experienced, further qualitative research should be undertaken to understand the social meaning of test performance (especially in experimental contexts) and the strategies that participants use when responding to stereotypically threatening situations.

This study was able to replicate the STL on science students in a South African educational context. However unlike other studies in the stereotype threat literature this study investigates ST and SL collectively by manipulating the valence of the stereotype both negatively and positively to produce the conditions for both ST and SL to occur in the same testing environment. As such this project allows researchers to consider ST aside from an automatic cognitive process and accommodate the tenet that increases and decreases in test performance associated with STL are strategic behavior changes in response to variables in the social context; highlighting the role of human agency in ST literature. .

By showing the influence of one socio-structural variable on the stereotype performance relationship, this research hopes to assist in formulating the argument that stereotype threat is a social predicament. If so then stereotype threat may have a general definition of a situational threat to one's group identity that results in a behavior change. Future stereotype threat research should further explore the value of SIT in modeling and understanding STL, especially exploring the role of macro-level socio-structural variables such as conflict, stability, legitimacy and permeability which have so far been largely ignored in the STL literature.



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## **Appendix A: Informed Consent**

Dear participant.

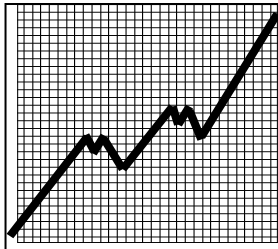
Thank you for volunteering for this study. Please remember that participation is voluntary and you can withdraw at any time without giving a reason. However, if you sign up for the study and then withdraw the researchers will try to contact you to make sure that you understand everything that you have experienced up to that point and that you have not been harmed in any way by participating. To maintain our research under strict ethical standards you will be required to indicate agreement to participate in the above research. This serves as a formal agreement of your participation in this study.

The results of the tests you complete will be analyzed for psychological research and the results may be presented at conferences and published in books and journals. However, the results will be completely anonymous. The data will be stored indefinitely by the investigator and will be accessed by other people working on the project, but they will not know who you are. The informed consent forms with your name on will be stored separately and will be shredded once they are no longer required (after five years) after which there will be no record that you have participated in this study.

It is unlikely that participating in this study will be harmful in any way, but please let us know if this was not the case. All participants will receive some cash as a token of appreciation and will be entered into a lucky draw to win a netbook (mini-laptop).

The contact details of the investigators who have undertaken this study are described below. Please feel free to contact the project supervisor if you have any queries regarding the study.

## Appendix B: Status lift manipulation



# Investigation of academic ability: Science vs Humanities

### The advantages of the cognitive style of Science students compared to Humanities students

#### EMPLOYMENT IN SOUTH AFRICA

Employment is a big problem in South Africa. Therefore there is increasing pressure a) to increase degree success rates (the number of students that graduate and are successful candidates for employment) and b) for universities to produce graduates who can succeed in the workplace. Therefore Universities need to be able to understand the factors that predict degree success and workplace success.

It is well known that people with an **analytic** cognitive style are much more likely to succeed in their **degrees and in the job market**. On the other hand, people who are too **flexible** are more likely to fail. Students with a **flexible** cognitive style are therefore at a serious **disadvantage**.

#### People with an “analytic” cognitive style:

- Are logical thinkers
- Can process complex information
- Can find accurate solutions to complex problems

#### DID YOU KNOW?

**Science** programmes attract and produce students with **analytic** cognitive styles while **Humanities** programmes attract and produce students with **flexible** cognitive styles.

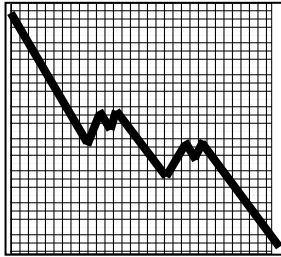
Strong **analytic** cognitive style is required for true mastery of knowledge and for success in all professional careers.

Students with a strong **analytic** cognitive style are substantially more likely to **succeed at university** and be **first-choice candidates for employment**.

Students with a strong **analytic cognitive style** are 63% more likely to become **employed** within a year of graduation.

The task that follows called the Raven’s Advanced Progressive Matrices tests the cognitive ability of students. This test is more suited to students with a strong **analytic** cognitive style than students with a strong **flexible** cognitive style. Therefore **Science** students are more likely to do **well** compared to **Humanities** students. It is important that you try your best in this test.

## Appendix C: Status threat manipulation



# Investigation of academic ability: Humanities vs Science

### The disadvantages of the cognitive style of Science students compared to Humanities students

#### EMPLOYMENT IN SOUTH AFRICA

Employment is a big problem in South Africa. Therefore there is increasing pressure a) to increase degree success rates (the number of students that graduate and are successful candidates for employment) and b) for universities to produce graduates who can succeed in the workplace. Therefore Universities need to be able to understand the factors that predict degree success and workplace success.

It is well known that people with a **flexible** cognitive style are much more likely to succeed in their **degrees and in the job market**. On the other hand, people who are too **analytic** are more likely to fail. Students with an **analytic** cognitive style are therefore at a serious **disadvantage**.

#### People with a “flexible” cognitive style:

- Are adaptable thinkers
- Can process conflicting information
- Can find multiple solutions to complex problems

#### DID YOU KNOW?

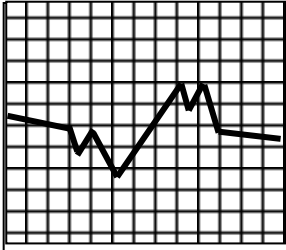
**Science** programmes attract and produce students with **analytic** cognitive styles while **Humanities** programmes attract and produce students with **flexible** cognitive styles. Strong **flexible** cognitive style is required for true mastery of knowledge and for success in all professional careers.

Students with a strong **flexible** cognitive style are substantially more likely to **succeed at university** and be **first-choice candidates for employment**.

Students with a strong **flexible cognitive style** are 63% more likely to become **employed** within a year of graduation.

The task that follows called the Raven’s Advanced Progressive Matrices tests the cognitive ability of students. This test is more suited to students with a strong **flexible** cognitive style than students with a strong **analytic** cognitive style. Therefore **Humanities** are more likely to do **well** compared to **Humanities** students. It is important that you try your best in this test.

## Appendix D: Status control manipulation



# Investigation of cognitive style

### EMPLOYMENT IN SOUTH AFRICA

Employment is a big problem in South Africa. Therefore there is increasing pressure a) to increase degree success rates (the number of students that graduate and are successful candidates for employment) and b) for universities to produce graduates who can succeed in the workplace. Therefore Universities need to be able to understand the factors that predict degree success and workplace success.

#### DID YOU KNOW?

Strong cognitive style is required for true mastery of knowledge and for success in all professional careers.

Students with a strong cognitive style are substantially more likely to **succeed at university** and be **first-choice candidates for employment**.

Students with a strong **cognitive style** are 63% more likely to become **employed** within a year of graduation.

The task that follows called the Raven's Advanced Progressive Matrices tests the cognitive style of students. It is important that you try your best in this test.

## Appendix E: Social Identity Inventory

Stereotype threat and lift manipulation check subscale

**Based on the description above, [LIFT GROUP] as a group have a good reputation with respect to [the task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Based on the description above, [THREAT GROUP] as a group have a good reputation with respect to [the task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Based on the description above, [the task] is more suited to the skills of [LIFT GROUP] than [THREAT GROUP]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Based on the description above, [the task] is more suited to the skills of [THREAT GROUP] than [LIFT GROUP]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Based on the description above, [LIFT GROUP MEMBERS] are likely to do better than [THREAT GROUP MEMBERS] on [the task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*Based on the description above, more [THREAT GROUP MEMBERS] are likely to badly compared to [LIFT GROUP MEMBERS] on [the task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Based on the description above, the best performing participant will probably be a [LIFT GROUP MEMBER]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*Based on the description above, the worst performing participant will probably be a [THREAT GROUP MEMBER]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Stereotype Agreement subscale

**How do you think the typical [LIFT GROUP MEMBER] would have experienced [the task] in terms of DIFFICULTY?**

| 1         | 2    | 3    | 4         |
|-----------|------|------|-----------|
| very hard | hard | easy | very easy |

**How do you think the typical [LIFT GROUP MEMBER] would have experienced [the task] in terms of ENJOYMENT?**

| 1         | 2    | 3    | 4         |
|-----------|------|------|-----------|
| very hard | hard | easy | very easy |

**How do you think the typical [LIFT GROUP MEMBER] would have PERFORMED on [the task]?**

| 1         | 2    | 3    | 4         |
|-----------|------|------|-----------|
| very hard | hard | easy | very easy |



**\*How do you think the typical [THREAT GROUP MEMBER] would have experienced [the task] in terms of DIFFICULTY?**

|           |      |      |           |
|-----------|------|------|-----------|
| 1         | 2    | 3    | 4         |
| very hard | hard | easy | very easy |

**\*How do you think the typical [THREAT GROUP MEMBER] would have experienced [the task] in terms of ENJOYMENT?**

|           |      |      |           |
|-----------|------|------|-----------|
| 1         | 2    | 3    | 4         |
| very hard | hard | easy | very easy |

**\*How do you think the typical [THREAT GROUP MEMBER] would have PERFORMED on [the task]?**

|           |      |      |           |
|-----------|------|------|-----------|
| 1         | 2    | 3    | 4         |
| very hard | hard | easy | very easy |

Conflict subscale

**I feel IRRITATED when I think about interacting with [the outgroup]**

|                   |          |                   |                            |                |       |                |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I feel UPSET when I think about interacting with [the outgroup]**

|                   |          |                   |                            |                |       |                |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I feel ANGRY when I think about interacting with [the outgroup]**

|                   |          |                   |                            |                |       |                |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*There is cooperation between the [ingroup] and [outgroup]**

|                   |          |                   |                            |                |       |                |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Subjective experience subscale

**I enjoyed doing [the DV task] very much**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[the DV task] was fun to do**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I think I am pretty good at [the DV task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*I was very relaxed while doing [the DV task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*I felt very nervous while doing [the DV task]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Effort subscale

**I put a lot of effort into the Raven's Advanced Progressive Matrices task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*I *did not* try very hard to do well at the Raven's Advanced Progressive Matrices task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**While doing the Raven's Advanced Progressive Matrices task, when I came to difficult problem I did my best to work it out.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*While doing the Raven's Advanced Progressive Matrices task, when I came to a difficult problem I did not mind guessing.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Achievement motivation subscale

**It is important for me to excel in most things I do**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I worry when I feel like I might not succeed at a task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*Being average does not bother me**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*Hard work is something I prefer to avoid**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Ingroup homogeneity

**The [ingroup] is united.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Ingroup members] have similar values**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Ingroup members] have a lot in common**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Most [Ingroup members] usually prefer doing similar things**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Outgroup homogeneity subscale

**The [outgroup] is united.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Outgroup members] have similar values**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Outgroup members] have a lot in common**

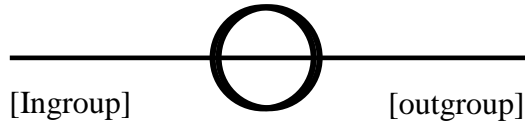
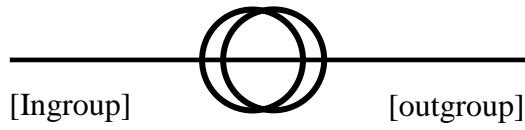
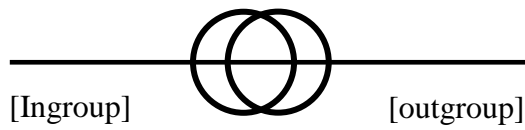
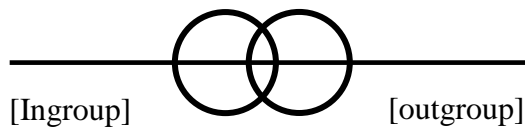
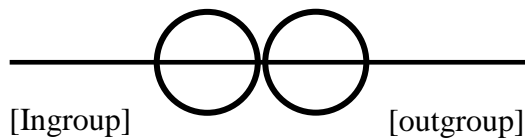
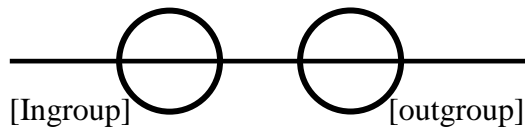
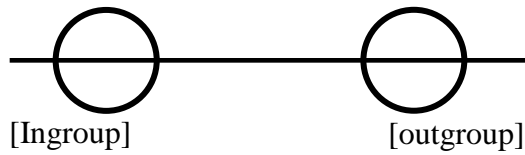
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Most [Outgroup members] usually prefer doing similar things**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Group Differentiation subscale

**Choose the picture that best represents the current closeness between [ingroup] and [outgroup]**



**There are important differences between the [ingroup] and [outgroup]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Outgroup] members are different from [ingroup] members.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**In general [ingroup members and outgroup members] are very similar to each other**

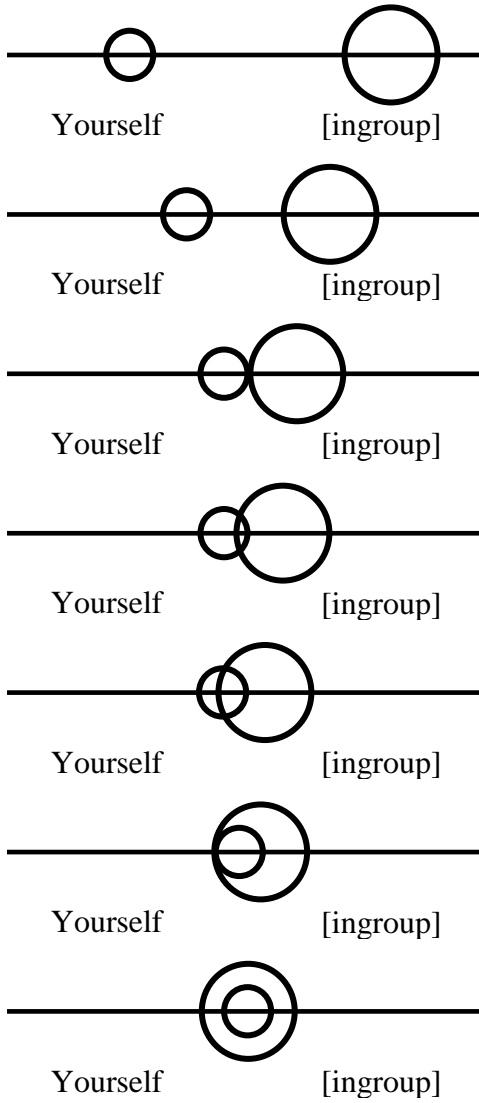
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Ingroup members and outgroup members] have a lot in common**

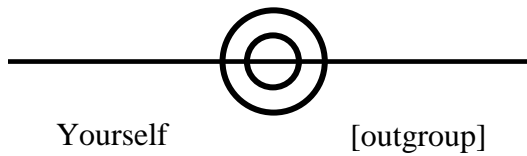
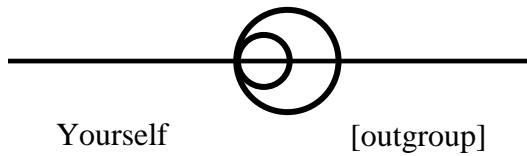
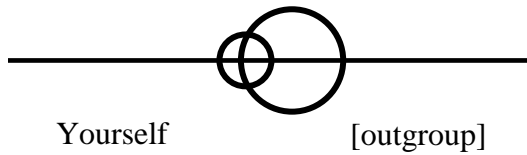
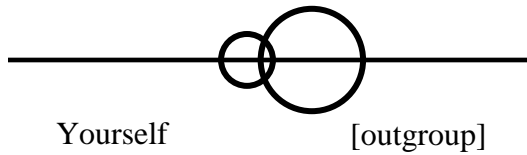
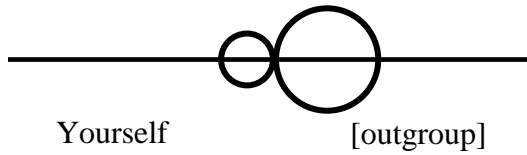
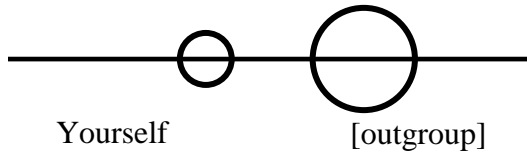
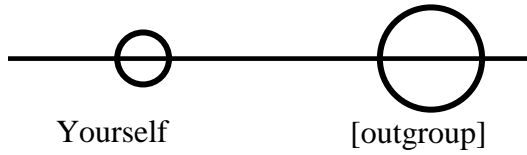
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Ingroup identification subscale

Choose the picture that best represents your own closeness to the [ingroup].



Choose the picture that best represents your own closeness to the [outgroup].



**My group is an important part of who I am as a person**

|                   |          |                   |                            |                |       |                |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |



**I feel strong ties with [ingroup] as a group**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Being an [ingroup member] affects the way I am and how I think**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**It feels bad when people say bad things about [my ingroup]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I am NOT proud to be a [ingroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I prefer not to see myself as [an ingroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Individual identifiability subscale

**I felt that I could be identified as an individual while I was doing the task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**People who see these test results will be able to recognise me in other contexts**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I felt like I was personally in the spotlight while I was doing the task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**People who saw this questionnaire would be able to trace me as an individual**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Group identifiability subscale

**My results will reflect more on my group [ie. ingroup] than on me as an individual**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | Agree | strongly agree |

**I am being seen more as a group member [ie. ingroup] than as an individual**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | Agree | strongly agree |

**I felt like my group [ie. ingroup] was in the spotlight while I was doing the task**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | Agree | strongly agree |

**I felt as if I was being tested on behalf of my group**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | Agree | strongly agree |

Legitimacy subscale

**The difference between [ingroup] and [outgroup] is justified and right.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | Agree | strongly agree |

**The difference between [ingroup] and [outgroup] makes sense. ("is reasonable" in original)**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*The difference between [ingroup] and [outgroup] is unfair.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*When people think the [high status group] is better than the [low status group] they are not seeing things as they really are**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Stability subscale

**Even if they try their best, [low status group] will not overtake [high status group]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**It's unlikely that [high status group] will lose their good reputation**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**No matter what they do, [low status group] will never have as much status as [high status group]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**The current gap between [ingroup] and [outgroup] will not change easily.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**\*The current gap between [ingroup] and [outgroup] is just temporary.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**I think the difference between [ingroup] and [outgroup] will remain stable for the few next years.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Permeability subscale

**It would be difficult for an [ingroup member] to adjust to being an [outgroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**An [ingroup member] would feel anxious about becoming an [outgroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**An [ingroup member] would feel confident about moving to [the outgroup]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[Ingroup members] would fit in well with [the outgroup]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Realistic threat subscale

**The [Outgroup] is gaining resources at the expense of [ingroup]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**It will take me longer to find a job because of [outgroup members] in the job market.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**If [outgroup] gets too successful then [ingroup] will really struggle to succeed.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Symbolic threat subscale

**[Outgroup members] don't understand the way that [ingroup members] view the world.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**[outgroup members] don't realize the true importance of [ingroup or core ingroup activity eg. "Studies in the Humanities]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**Most [outgroup members] will never understand what [ingroup members] are like.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**The values that are important to [ingroup members] are under threat, because of the influence of [outgroup] values.**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Category Saliency subscale

**While I was doing [the task] I was not aware that I am an [ingroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**While I was doing [the task] I felt very much like [an ingroup member]**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

**While I was doing [the task] I thought of myself as an [ingroup member].**

| 1                 | 2        | 3                 | 4                          | 5              | 6     | 7              |
|-------------------|----------|-------------------|----------------------------|----------------|-------|----------------|
| strongly disagree | disagree | somewhat disagree | neither disagree nor agree | somewhat agree | agree | strongly agree |

Previous academic performance subscale

**What mark best describes your usual academic performance?**

\_\_\_\_\_

**What were your six best matric symbols (eg. A, B, B, D, E, F etc.)?**

\_\_\_\_\_

**What symbol was your matric aggregate (eg. A, B, B, D, E, F etc.)?**

\_\_\_\_\_

Social Desirability subscale

**Listed below are a few statements about your relationships with others.**

**How much is *each* statement TRUE or FALSE for you?**

**I am always polite, even to people who are unpleasant**

| 1               | 2           | 3          | 4            | 5              |
|-----------------|-------------|------------|--------------|----------------|
| definitely true | mostly true | don't know | mostly false | Somewhat false |

**There have been occasions when I took advantage of someone**

| 1               | 2           | 3          | 4            | 5              |
|-----------------|-------------|------------|--------------|----------------|
| definitely true | mostly true | don't know | mostly false | Somewhat false |

**I sometimes try to get even with people rather than forgive and forget**

| 1               | 2           | 3          | 4            | 5              |
|-----------------|-------------|------------|--------------|----------------|
| definitely true | mostly true | don't know | mostly false | Somewhat false |

**I sometimes feel resentful when I don't get my way**

| 1               | 2           | 3          | 4            | 5              |
|-----------------|-------------|------------|--------------|----------------|
| definitely true | mostly true | don't know | mostly false | Somewhat false |

**No matter who I'm talking to, I'm always a good listener**

| 1               | 2           | 3          | 4            | 5              |
|-----------------|-------------|------------|--------------|----------------|
| definitely true | mostly true | don't know | mostly false | Somewhat false |

Demographics subscale

Sex:

|        |      |
|--------|------|
| Female | Male |
|--------|------|

Race:

|               |          |        |       |                  |
|---------------|----------|--------|-------|------------------|
| Black African | Coloured | Indian | White | Other (specify): |
|---------------|----------|--------|-------|------------------|

What is your nationality?

|               |                  |
|---------------|------------------|
| South African | Other (specify): |
|---------------|------------------|

What degree are you currently registered for?

|  |
|--|
|  |
|--|

## Appendix F: Debriefing Document

**NOTE: If other potential participants hear about the information in this document then our study could be ruined! Please help us by keeping this information secret from anyone who may participate.**

Stereotype threat and stereotype lift is a change in task performance as a result of a target perceiving that they are being stereotyped. Stereotype threat leads to a decline in performance on a task. Conversely stereotype lift leads to an increase in performance on a task. Stereotype threat or lift applies to anyone who is a member of a group and is at risk of being stereotyped, such as a woman in maths or science.

In this experiment we were interested in (a) the extent to which stereotype threat occurs with relatively harmless categories like “Science” and “Humanities” and (b) the extent to which perceived conflict between the groups modifies the stereotype threat effect.

To explore these questions, we made you aware of your group membership and of a stereotype about the cognitive abilities of Humanities and Science students. In addition we provided you with a situation in which you were led to believe that you were engaging in a hostile or cooperative relationship with humanities students (depending on the condition to which you were assigned).

Because knowledge of the aims of the study would have changed your responses, we were forced to deceive you about some of the tasks and manipulations that you experienced:

- It is not a researched fact that the cognitive abilities of humanities and science are different and more or less suited for degree and career success (although we did draw on a commonly held stereotype that this is the case). Therefore you were placed in a situation in which you were led to believe that humanities students were superior or inferior to you, even though we actually have no research evidence to support this. **Therefore, if you were told that Humanities students have more chance of success in the real world, please note that this was an experimental manipulation and is not true.**
- The computer-based “interaction” with the humanities students was a bogus simulation – there was actually no interaction with humanities students and the results were rigged to make you believe that you were either cooperating or conflicting with Humanities students.
- Although we told you that you would receive *up to* R30 based on the Humanities students’ responses in order to heighten your sense of conflict or cooperation, in fact all participants will R30 as a token of appreciation for their participation.

### **Avoiding Stereotype Threat in Everyday Life.**

Although we all belong to groups and therefore experience the stereotype threat in everyday life, there are some ways in which the effects can be avoided or reduced. Firstly, research has shown that knowledge of the effect reduces it – so participating in this study may help you avoid the effect in everyday life if you understand and remember it. Other things you can do in situations in which you feel you are being negatively stereotyped include the following:

- 1) Focus on positive identities (such as “I am a Science student”) instead of the stereotyped group membership (e.g. “I am disabled”).
- 2) It can help to focus on your ‘superordinate’ group membership (e.g. “I am a soccer player”) rather than the negatively stereotyped group



membership (eg. "I am a white soccer player") 3) Since stereotype threat increases stress and reduces performance, it often leads to targets losing motivation, so remembering that part of your stress arises from the stereotype threat effect rather than the task itself may help you to remain motivated, focussed and engaged.

Thank you for your cooperation in this study. We hope that you have learnt enough about stereotype threat theory that you will be able to guard against it in everyday life. For more information, or if you have any queries or complaints please contact or Tamlyn Seunanden (071 2273 477) or Mike Quayle (033 2605016)

**Appendix G: Social Identity Inventory subscale reliability**

|    | Subscale                   | Number of items | Cronbach's Alpha $\alpha$ |
|----|----------------------------|-----------------|---------------------------|
| 1  | Achievement motivation     | 3               | .584                      |
| 2  | Ingroup identifiability    | 4               | .700                      |
| 3  | Individual identifiability | 3               | .607                      |
| 4  | Effort                     | 4               | .738                      |
| 5  | Group differentiation      | 5               | .662                      |
| 6  | Ingroup homogeneity        | 4               | .627                      |
| 7  | Outgroup homogeneity       | 4               | .705                      |
| 8  | Ingroup identification     | 8               | .308                      |
| 9  | Stability                  | 6               | .386                      |
| 10 | Permeability               | 4               | .196                      |
| 11 | Realistic threat           | 3               | .441                      |
| 12 | Symbolic threat            | 4               | .670                      |
| 13 | Previous academic history  | 3               | .231                      |
| 14 | Social desirability        | 5               | .213                      |
| 15 | Category salience          | 3               | .822                      |
| 16 | Legitimacy                 | 4               | .627                      |

## Appendix H: Descriptive statistics of the Shipley Institute of Living Scale

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|            | Mean  | Standard Deviation | N   |
|------------|-------|--------------------|-----|
| Shipley.1  | .9590 | .19907             | 122 |
| Shipley.10 | .8361 | .37174             | 122 |
| Shipley.11 | .6148 | .48866             | 122 |
| Shipley.12 | .7295 | .44605             | 122 |
| Shipley.13 | .5738 | .49657             | 122 |
| Shipley.14 | .4180 | .49527             | 122 |
| Shipley.15 | .4180 | .49527             | 122 |
| Shipley.16 | .3115 | .46501             | 122 |
| Shipley.17 | .1721 | .37905             | 122 |
| Shipley.18 | .3361 | .47431             | 122 |
| Shipley.19 | .4016 | .49225             | 122 |
| Shipley.2  | .9180 | .27545             | 122 |
| Shipley.20 | .3607 | .48217             | 122 |
| Shipley.3  | .9016 | .29903             | 122 |
| Shipley.4  | .9098 | .28760             | 122 |
| Shipley.5  | .8852 | .32004             | 122 |
| Shipley.6  | .9098 | .28760             | 122 |
| Shipley.7  | .9016 | .29903             | 122 |
| Shipley.8  | .8443 | .36410             | 122 |
| Shipley.9  | .7951 | .40531             | 122 |

## Appendix I: Descriptive statistics of the Raven's Advanced Progressive Matrices

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|         | Mean  | Standard Deviation | N   |
|---------|-------|--------------------|-----|
| APM1.1  | .9180 | .27545             | 122 |
| APM1.2  | .9180 | .27545             | 122 |
| APM2.10 | .3852 | .48866             | 122 |
| APM2.12 | .6311 | .48448             | 122 |
| APM2.15 | .4426 | .49875             | 122 |
| APM2.16 | .4754 | .50145             | 122 |
| APM2.18 | .4180 | .49527             | 122 |
| APM2.21 | .3033 | .46157             | 122 |
| APM2.22 | .2459 | .43240             | 122 |
| APM2.28 | .2213 | .41684             | 122 |
| APM2.30 | .1475 | .35611             | 122 |
| APM2.31 | .0902 | .28760             | 122 |
| APM2.34 | .0820 | .27545             | 122 |
| APM2.4  | .6230 | .48665             | 122 |

## Appendix J: Means and standard deviation of status and conflict interaction

| Status condition | Conflict condition | <i>M (SD)</i> | <i>CI</i> |           |
|------------------|--------------------|---------------|-----------|-----------|
|                  |                    |               | <i>LL</i> | <i>UL</i> |
| Threat           | Low conflict       | .490 (.048)   | .395      | .584      |
|                  | High conflict      | .403 (.038)   | .327      | .478      |
| Lift             | Low conflict       | .315 (.051)   | .213      | .417      |
|                  | High conflict      | .443 (.036)   | .371      | .516      |
| Control          | Low conflict       | .397 (.032)   | .335      | .460      |
|                  | High conflict      | .357 (.042)   | .274      | .440      |

Note. *LL*= lower limit, *UL*= upper limit

## Appendix K: Summary of Hierarchical Regression Analysis for stability

| Variable                        | Stability |                |
|---------------------------------|-----------|----------------|
|                                 | B         | 95% CI         |
| Constant                        | .448      | [.378, .519 ]  |
| Condition.conflict              | -.006     | [-.072, .060]  |
| Condition.status                | .113      | [-.001, .227]  |
| Stability by status interaction | -.037     | [-.066, -.008] |
| $R^2$                           |           | .066           |
| $F$                             |           | 2.720          |
| $\Delta R^2$                    |           | .053           |
| $\Delta F$                      |           | 6.566          |

**Appendix L: Summary of Hierarchical Regression Analysis for  
in-group homogeneity**

| Variable                        | Group homogeneity |                |
|---------------------------------|-------------------|----------------|
|                                 | B                 | 95% CI         |
| Constant                        | .441              | [.371, .510]   |
| Condition.conflict              | -.012             | [-.078, .054]  |
| Condition.status                | .138              | [.003, .273]   |
| Stability by status interaction | -.034             | [-.061, -.007] |
| $R^2$                           |                   | .065           |
| $F$                             |                   | 2.701          |
| $\Delta R^2$                    |                   | .051           |
| $\Delta F$                      |                   | 6.368          |

**Appendix M: Table of means for status-conflict interaction with sex**

| Status condition | Conflict condition | Sex         | <i>M (SD)</i> | <i>N</i> | <i>CI</i> |           |
|------------------|--------------------|-------------|---------------|----------|-----------|-----------|
|                  |                    |             |               |          | <i>LL</i> | <i>UL</i> |
| Threat           | Low conflict       | female      | .500 (.143)   | 4        | .326      | .674      |
|                  |                    | Male        | .486 (.174)   | 10       | .375      | .596      |
|                  |                    | Total       | .490 (.161)   | 14       |           |           |
|                  | High conflict      | female      | .343 (.134)   | 10       | .233      | .453      |
|                  |                    | Male        | .452 (.207)   | 12       | .352      | .553      |
|                  |                    | Total       | .403 (.183)   | 22       |           |           |
|                  | Total              | female      | .388 (.150)   | 14       |           |           |
|                  |                    | Male        | .468 (.189)   | 22       |           |           |
|                  |                    | Total       | .437 (.177)   | 36       |           |           |
| Lift             | Low conflict       | female      | .357 (.226)   | 4        | .183      | .532      |
|                  |                    | Male        | .295 (.150)   | 8        | .171      | .418      |
|                  |                    | Total       | .316 (.171)   | 12       |           |           |
|                  | High conflict      | female      | .484 (.174)   | 9        | .368      | .600      |
|                  |                    | Male        | .419 (.140)   | 15       | .329      | .509      |
|                  |                    | Total       | .444 (.153)   | 24       |           |           |
|                  | Total              | female      | .445 (.192)   | 13       |           |           |
|                  |                    | Male        | .376 (.153)   | 23       |           |           |
|                  |                    | Total       | .401 (.168)   | 36       |           |           |
| Control          | Low conflict       | female      | .419 (.179)   | 15       | .329      | .509      |
|                  |                    | Male        | .388 (.212)   | 17       | .294      | .463      |
|                  |                    | Total       | .397 (.194)   | 32       |           |           |
|                  | High conflict      | female      | .279 (.173)   | 11       | .174      | .384      |
|                  |                    | Male        | .480 (.163)   | 7        | .348      | .611      |
|                  |                    | Total       | .357 (.193)   | 18       |           |           |
|                  | Total              | female      | .360 (.185)   | 26       |           |           |
|                  |                    | Male        | .408 (.199)   | 24       |           |           |
|                  |                    | Total       | .383 (.195)   | 50       |           |           |
| Total            | Low conflict       | female      | .422 (.179)   | 23       |           |           |
|                  |                    | Male        | .390 (.195)   | 35       |           |           |
|                  |                    | Total       | .402 (.188)   | 58       |           |           |
|                  | High conflict      | female      | .361 (.178)   | 30       |           |           |
|                  |                    | Male        | .443 (.168)   | 34       |           |           |
|                  |                    | Total       | .405 (.176)   | 64       |           |           |
| Total            | female             | .388 (.179) | 53            |          |           |           |
|                  | Male               | .416 (.183) | 69            |          |           |           |
|                  | Total              | .404 (.181) | 122           |          |           |           |