The effects of racial group membership and cognitive load on empathy and helping behavior

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Declaration

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Abbreviations

ACC	Anterior cingulate cortex
AI	Anterior insula
ANS	Autonomic nervous system
AR	Autoregressive analysis
BP	Blood pressure
DKEFS	Delis-Kaplan Executive Functioning Scale
ECG	Electrocardiogram
EEG	Electroencephalographic
EMS	External Motivation to Respond Without Prejudice
ERP	Event related potential
fMRI	Functional magnetic resonance imaging
HF	High frequency
HR	Heart rate
ICG	Impedance cardiogram
IMS	Internal Motivation to Respond Without Prejudice
LF	Low frequency
MEIM	Multi-group Ethnic Identity Measure
MPFC	Medial prefrontal cortex
PCC	Posterior cingulate cortex
PEP	Pre-ejection period
PNS	Parasympathetic nervous system
QCAE	Questionnaire of Cognitive and Affective Empathy
SC	Skin conductance
SCL	Skin conductance level
SCR	Skin conductance response
SNS	Sympathetic nervous system
SRPP	Student Research Participation Program
RFF	Ruff Figural Fluency
RSA	Respiratory sinus arrhythmia
TF	Total frequency
TRC	Truth and Reconciliation Committee
VAS	Visual analogue scale
VU-AMS	Vrije Universiteit Ambulatory Monitoring System
VU-DAMS	Vrije Universiteit Data analysis and Management Software
UCT	University of Cape Town

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Abstract

Research suggests that people feel more empathy for racial in-group compared to racial out-group members, and in some circumstances, are more likely to help racial in- than out-group members. Furthermore, there is evidence that cognitive load may also attenuate helping behavior. Research is yet to establish the influence of both racial group membership and cognitive load on empathy and helping, however. In this study, a sample of 104 women (52 Black and 52 White) completed either a Low or a High cognitive load task and then viewed video clips depicting racial in- and out-group members in distress. I measured participants' self-reported empathy, physiological activity, and willingness to help those in distress. The results did not show the expected racial bias in empathic responding, but rather, indicated heightened empathy (seen in both self-reported and physiological responses) for the Black target individual, regardless of participant race. Secondly, although cognitive load did not influence empathic responding, participants in the High Load condition were less likely to offer help than participants in the Low Load condition. Finally, correlation data suggest that racial group membership and cognitive load contributed to the associations between individual differences (i.e., in ethnic identification, motivations to respond without prejudice, and trait empathy), empathic responding, and helping behavior. Overall, the findings contribute to a growing literature on cross-racial empathy, and highlight the complex physiology underlying our empathy for others.

Keywords: cognitive load, empathy, helping behavior, racial group membership

Seeing a person in physical or emotional pain often leads us to experience some of their suffering. The term *empathy* describes this capacity to feel and understand another's emotions, even while recognizing that their emotional experience is separate from our own (Decety & Lamm, 2006; Zaki, 2014). Furthermore, empathizing with and feeling compassion for an individual in distress often motivates behavior aimed at alleviating that person's suffering (Batson, Lishner, & Stocks, 2015; Eisenberg & Miller, 1987).

However, witnessing a person in distress does not inevitably evoke feelings of empathy, nor does it always result in helping behavior directed towards the person in pain. Even though we may encounter many potential empathy-eliciting scenarios in our everyday lives, we only respond empathically to a fraction of them (de Vignemont & Singer, 2006; Decety, 2011). Otherwise stated, the empathic experience is not constant and instantaneous, but rather the degree to which we respond empathically varies according to several mediating factors (de Vignemont & Singer, 2006). These mediating factors influence the extent to which we feel for the other, and the extent to which our empathic feelings motivate us to assist the other.

One important factor that may influence our empathic reaction is the group membership of the person in distress: Typically, we feel greater empathy when we share a social category with the person in distress (Batson, Lishner, Cook, & Sawyer, 2005). Greater in-group empathy and helping behavior occurs in groups defined according to the degree of genetic relatedness, degree of similarity, and shared interests between in-group members (Batson et al., 2005; Hein, Silani, Preuschoff, Batson, & Singer, 2010; Maner & Gailliot, 2007). Given the tendency for groups to form according to coalitions that share resources (Cosmides, Tooby, & Kurzban, 2003), the in-group empathic bias may extend to groups divided according to racial categories: People tend to feel more empathy for others of their own race than for racial out-group members

(e.g., Xu, Zuo, Wang, & Han, 2009). Taking the argument one step further, feeling less empathy for racial out-group members may decrease the likelihood of helping those individuals (Cuddy, Rock, & Norton, 2007; Mathur, Harada, Lipke, & Chiao, 2010).

In addition to feelings of empathy, our willingness to help someone in distress may also depend on the self-regulatory capacities we have available to attend to their needs. Engaging in activities that demand self-regulation, for example, may result in a reduced ability to suppress our selfish urges and direct resources to help the person in distress (DeWall, Baumeister, Gailliot, & Maner, 2008). Furthermore, some empirical research suggests that there is an interaction between available self-regulatory resources and group membership status, so that individuals with depleted resources will show even further reduced empathy and helping behavior towards social out-group members (DeWall et al., 2008).

Although previous studies have examined the attenuating effects of racial group membership on empathic responding (e.g., Drwecki, Moore, Ward, & Prkachin, 2011; Mathur et al., 2010; Neumann, Boyle, & Chan, 2013; Xu et al., 2009), findings on the effects of reduced self-regulatory capacities on empathy have thus far been inconsistent (Rameson, Morelli, & Lieberman, 2012; Wagner & Heatherton, 2012). Furthermore, no study has investigated the effects of diminished cognitive capacities on both empathic responding and on helping behavior towards racial out-group members. Gaining further understanding of the dynamic interplay between racial group membership and cognitive processes in terms of empathic responding is crucial to helping understand the mechanisms underlying cross-racial empathy, specifically, and empathic responding, generally.

Conceptualizing Empathy

The empathic response encompasses three distinct but cooperative components: affective (empathic) arousal, empathic understanding, and empathic concern (Decety & Svetlova, 2012; Gleichgerrcht & Decety, 2013). *Affective arousal* refers to the automatic somato-sensorimotor resonance of core affect (pleasant or unpleasant) observed in another. For example, seeing an individual in distress may instantly lead to unpleasant feelings within the empathic observer. *Empathic understanding* involves the ability to take another's perspective and to thus recognize their affective state. Here, the empathic observer experiences a degree of another's distress, but is able to recognize that their feelings result from an interaction with the other (Decety & Michalska, 2010). Empathic understanding develops from *emotion awareness,* where sensory, motivational, and social conditions are internally synthesized to ascertain the emotion another experiences (Decety, 2011). Finally, *empathic concern* describes the feelings of care and compassion felt for the person in need. This other-oriented response may motivate an attempt to help the other individual overcome their challenging situation (Batson, Fultz, & Schoenrade, 1987; Batson et al., 2015).

Each empathic component is sensitive to bottom-up automatic affective processes and to top-down perceiver-controlled cognitive processes, which feed into each other (Decety & Michalska, 2010). In some cases, too much affective arousal may produce personal distress within the observer, promoting a self-focused escape response rather than an other-oriented empathic response (Decety, 2011). Executive functions consciously regulate the self-focused distress response, allowing for an awareness of the other's perspective and concern for their circumstances (Decety & Meyer, 2008). This process of emotion regulation relies on top-down motivation and affect control to produce an empathic and behavioral response that is appropriate

to the situation (Decety, 2011). Similarly, affective arousal processes continually update top-down systems to control the decision making that may result in helping behavior (Decety & Lamm, 2006). These interconnected mechanisms function together producing an overall empathic response that combines automatic affect sharing as well as intentional feelings of concern (Decety, 2011).

The high level of executive functioning (i.e., top-down cognitive control) in the human empathic response affects each empathic component process. Working memory and learning capacities allow for the evaluation of emotional stimuli through cognitive appraisal processes and the individual is able to adapt his empathic behavior based on previous experiences (Lamm, Batson, & Decety, 2007; Preston & de Waal, 2002). Integrating knowledge about the person in need with the individual's own motivational state determines whether the degree of empathic concern for the person in need will result in helping behavior (de Vignemont & Singer, 2006).

Because empathic helping behavior may have evolved to promote survival of the group (Preston & de Waal, 2002), greater empathy and helping behavior is expected for kin and close friends than for strangers and social out-group members (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997; Stürmer, Snyder, Kropp, & Siem, 2006). Thus, factors such as racial group membership may moderate all component processes of empathy, including empathic arousal, understanding, and concern. In addition, any decreases in an individual's self-regulatory cognitive capacities may reduce emotion regulation processes, decreasing his capacity for empathic understanding and concern.

In-Group Empathic Bias

Empathically-motivated communication encourages resource-sharing and social bonding, thereby increasing the rate of survival and reproduction amongst group members (Decety, Norman, Berntson, & Cacioppo, 2012; Preston & de Waal, 2002). Consequently, when interactions are between individuals of different social groups, feelings of empathy are stronger for the individuals who share resources with the perceiver (i.e., those who belong to the same social group as them; Stürmer et al., 2006).

According to evolutionary theory, individuals (usually of the same race) formed social groups and alliances to facilitate resource-sharing (Cosmides et al., 2003; de Waal, 2008). Humans may thus detect and encode race as a by-product of an adaptation to identify fellow group members (Kurzban, Tooby, & Cosmides, 2001). Individuals tend to automatically classify others according to their racial group membership, even though they may not be aware of doing so (Amodio, 2008). Race therefore remains a salient form of group categorization (Seekings, 2008). Hence, the commonly observed in-group empathic bias results from groups divided according to kinship and genetic relatedness (Cialdini et al., 1997) and racial group membership (Contreras-Huerta, Baker, Reynolds, Batalha, & Cunnington, 2013). In fact, recent research suggests that racial categorization may be a stronger moderator of the in-group bias in empathic neural processing than general social group categorization (i.e., by assigning participants into random teams; Contreras-Huerta et al., 2013).

Extensive research suggests that the racial in-group bias affects all levels of empathic processing, including the initial affective arousal response, and the eventual empathic understanding and concern for the individual's situation.

Effects of in-group bias on affective arousal. Numerous pain paradigm studies have demonstrated dampened autonomic affective arousal for out-group members (Avenanti, Sirigu, & Aglioti, 2010; Eres & Molenberghs, 2013; Sessa, Meconi, Castelli, & Dell'Acqua, 2014; Xu et al., 2009). For example, a functional magnetic resonance imaging (fMRI) study in which Chinese and White participants viewed images of racial in-group and racial out-group individuals receiving painful needle pricks found differential neural responses depending on the race of the person in pain (Xu et al., 2009). Specifically, there was greater anterior cingulate cortex (ACC) activity in response to images of racial in-group compared to racial out-group members experiencing pain. Given the known associations between the ACC and the subjective experience of pain (Jackson, Meltzoff, & Decety, 2005; Singer et al., 2004), the authors suggested that their results indicated greater affect sharing and affective empathy for members of one's own racial group.

Similarly, Forgiarini and colleagues (2011) measured White participants' skin conductance responses (SCR) to short video clips depicting White, Asian, and African people experiencing pain due to a needle prick. Their findings confirmed an in-group bias in affective arousal: Participants showed the greatest SCR toward videos of White people (physically the most similar to the participants) in pain, with the least SCR for videos of African people (physically the least similar to the participants) in pain. In addition, participants' in-group bias in affective arousal was associated with greater levels of racial prejudice on an implicit measure of racism. The different amount of affective arousal for the Asian and African individuals in pain may result from participants attributing different degrees of dehumanization to each out-group member. Participants attributed greater dehumanization to the African than the Asian people in pain (Forgiarini et al., 2011).

Increased affective sharing in response to own-race others is not exclusive to scenarios depicting individuals in physical pain; it also extends to scenarios depicting individuals experiencing emotional pain, such as sadness. Gutsell and Inzlicht (2012) recorded right and left hemisphere frontal electroencephalographic (EEG) alpha oscillations in response to (a) self-induced sadness and (b) sadness induced by watching videos of racial in-group and out-group members expressing sadness. Results indicated similar right prefrontal alpha oscillation scores in response to self-induced sadness and to viewing in-group members expressing sadness, suggesting that the response to a racial in-group member's emotional experience is similar to an individual's own emotional experience. There were, however, decreased right prefrontal alpha oscillation scores in response to viewing out-group members' sadness compared to self-induced sadness. The authors based their interpretations on the assumption that left frontal EEG activity is associated with approach-related positive affective states (such as happiness), whereas right frontal EEG activity is associated with avoidance-related negative affective states (Peterson, Gable, & Harmon-Jones, 2008). Thus, participants' right frontal oscillation scores in response to out-group members' sadness suggest that they experienced less emotion sharing with out-group members compared to in-group members (Gutsell & Inzlicht, 2012).

The bias in the affective arousal component of the empathic response may also lead to a reduced ability to take the perspective and feel empathy towards that person, and hence decrease the likelihood of helping him (Cuddy et al., 2007).

Effects of in-group bias on empathic understanding. Empathic understanding (i.e., the ability to infer the mental state of another by taking their perspective), may also be moderated by racial group membership. Research demonstrates decreased perspective-taking for racial out-group compared to racial in-group members (Neumann et al., 2013). This reduced ability to take

the perspective of a racial out-group member is especially significant when observing a person experience negative emotions. For example, when Asian and White participants viewed photographs of members of both race groups in negative contexts (e.g., related to illness, grief, injury) and positive contexts (e.g., related to a party, amusement, and smiling), participant self-report data indicated greater perspective-taking and empathic understanding for own-race group members than other-race group members, particularly in negative situations (Neumann et al., 2013). The authors propose that because participants may have a greater familiarity with positive contexts than negative contexts, the negative contexts may have been more salient to participants (compared to the positive contexts). Participants thus reported greater empathy for the own-race than the other-race group member in negative situations than positive situations. These results support other literature suggesting that individuals tend to experience greater empathy in negative contexts than positive contexts (Field, Healy, Goldstein, & Guthertz, 1990).

Perspective-taking increases empathic capacity by including the other in one's own self-concept, and thereby merging the "self-other gap". The reduced self-other gap results in an individual understanding someone else's emotions as if they are experiencing the situation themselves (Galinsky & Ku, 2004). Merging another into one's own self-concept results in a feeling of "oneness" and a sense of shared identity with the other. People experience self-other merging with those whom they perceive as more similar to themselves, such as family members and close friends (Cialdini et al., 1997). Taking the perspective of an out-group member may help increase the self-other overlap with the out-group member, resulting in increased concern for the out-group member's situation, and thereby encouraging helping behavior.

In summary, people are more likely to take the perspective of racial in-group members than racial out-group members, especially when out-group members are in situations of

emotional distress. Empathic understanding may thus also be moderated by racial group membership.

Effects of in-group bias on empathic concern. Feelings of empathic concern (i.e., compassion, tenderness, and warmth) toward a person experiencing emotional pain often motivate behavior aimed at helping that individual overcome his situation (Drwecki et al., 2011; Eisenberg & Miller, 1987). Empathic concern and resulting helping behaviors are generally less likely when the person in distress belongs to a racial out-group, however (Drwecki et al., 2011; Mathur et al., 2010). For example, Drwecki et al. (2011) found that White participants reported greater empathic concern for White individuals in pain than for Black individuals in pain, and offered higher levels of analgesic treatment for their in-group members. In addition, a study that assessed neural activity in response to racial in- and out-group members in pain found greater medial prefrontal cortex (MPFC) activity in response to in-group members compared to out-group members in pain (Mathur et al., 2010). The increased activity in that brain region predicted greater feelings of empathy for in-group members, as well as greater motivation to help racial in- versus out-group members. The authors concluded that this increased MPFC activity was associated with cognitive empathic processing and that altruistic motivation for in-group members is thus associated with cognitive but not affective components of empathy.

Although group membership has a significant influence on empathic responding, empathy is not solely influenced by external factors such as the race of the individual in distress. Individual differences, for instance, may moderate the extent to which there is an in-group bias in empathic responding.

Individual Differences and the In-Group Bias in Empathy

Empathic responding to members of different social groups may depend on traits within the empathic responder. That is to say, some individuals might be more likely to show a strong in-group bias in empathic responding than others. Empirical research has confirmed this proposition. For instance, Mathur et al. (2010) showed that individuals higher in trait empathy are less likely to show biased empathic responding. Furthermore, individuals who have higher amounts of contact with racial out-group members (i.e., by interacting with racial out-group members on a frequent basis), may also be less likely to show biased empathic responding towards those individuals (Cao, Contreras-Huerta, McFadyen, & Cunnington, 2015; Swart, Hewstone, Christ, & Voci, 2011).

Empirical studies also show that the strength of racial identification may contribute to the racial bias in empathic responding (Mathur, Harada, & Chiao, 2012; Mathur et al., 2010). Although social group membership defined according to race is a prominent aspect of interactions amongst individuals, the extent to which people identify with their own racial group varies from person to person (Phinney, 1992; Utsey, Chae, Brown, & Kelly, 2002). Some individuals regard their racial identity as a crucial part of their self-concept, whereas others may not feel a strong belonging to their racial group (Mathur et al., 2012; Phinney, 1992). Hence, the strength of this racial-group identification may predict the extent of empathic responding towards both racial in- and out-group members.

Individuals who have a strong identification with their own racial group are inclined to feel greater empathy for and experience a greater motivation to help members of that group (Mathur et al., 2012, 2010). For example, studies examining bidirectional empathic responses between Black and White participants have found that Black participants score higher on a

measure assessing the strength of identification with their own racial or ethnic group, and are more likely to show a bias in empathic responding (Mathur et al., 2012, 2010). High strength of identification with one's racial group makes it more likely that the individual will process the emotions of racial in-group individuals in a self-referential manner, resulting in greater empathy towards fellow racial in-group members.

Another important factor that contributes to variation in intergroup relations are motivations to respond without prejudice (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002). Because overt racial discrimination is no longer socially acceptable, society generally favors individuals who act in non-prejudiced ways. Individuals are therefore motivated by this societal pressure to alter their behavior in order to appear non-prejudiced and egalitarian. The strength of the motivations to respond without prejudice, and the extent to which the motivations influence behavior, however, varies between individuals (Butz & Plant, 2009). Furthermore, the motivation to appear non-prejudiced may stem from an internal drive (e.g., in the case where appearing non-prejudiced is important to an individual's self-concept), or from external pressures (e.g., in the case where appearing non-prejudiced is important to avoid judgment or punishment from others; Plant & Devine, 1998). Greater internal motivations to respond without prejudice correlate negatively with prejudicial attitudes, and thus may influence a person's empathic capacities for racial in-group versus out-group members (Devine et al., 2002).

In summary, strength of racial identification and motivations to respond without prejudice are two possible traits that may act to influence empathic responding to racial in- and out-group members. Individuals who are internally motivated to respond without prejudice may be less subject to in-group empathic biases, whereas individuals who identify strongly with their own racial group may show a greater in-group empathic biases.

Racial Group Membership and Helping Behavior

Given that empathy is a strong motivator of helping behavior (Batson et al., 2015; Eisenberg & Miller, 1987; Hein et al., 2010), it is likely that racial group membership influences helping behavior just as it does empathic responding. The relationship between racial group membership and helping behavior appears to be complex, however. On the basis of a quantitative analysis of 31 studies featuring 14,368 participants in total, meta-analytic data on helping behavior of White individuals directed toward Black individuals indicate no overall tendency to discriminate against racial out-group members (Saucier, Miller, & Doucet, 2005). On average, the studies reviewed by Saucier et al. suggest that White individuals tend to help Black and White individuals to equal degrees, except when helping requires considerable effort, time, or risk. In these latter situations, White individuals tend to favor helping racial in-group members over racial out-group members. According to Saucier and colleagues, the literature suggests that when helping requires greater resources, individuals are able to cognitively justify not helping by basing their decision on reasons other than the race of the person in need. Although helping in-group members may be largely motivated by empathic concern, helping out-group members may involve further decision-making based on the costs and benefits of offering help (Stürmer et al., 2006).

Helping behavior may therefore require individuals to self-regulate their impulses in order to offer help. It appears, then, that higher-order empathic concern and subsequent helping behavior may involve a great degree of executive regulation. The question that then arises is how periods of increased self-regulation and utilization of executive function influences empathic responding and helping behavior, particularly towards racial out-group members. It is possible

that empathically-motivated helping behavior toward racial out-group members may be reduced when these cognitive capacities are diminished.

Effects of High Cognitive Demands on Helping Behavior

Engaging in motivational conflict, such as making the decision to help, relies on a complex set of cognitive capacities, including effective self-regulation (DeWall et al., 2008). The limited-resource depletion model assumes that individuals have a finite cognitive capacity (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Within this model, *ego depletion* refers to a temporary reduction in the ability to engage attentional resources, control one's choices, and regulate one's actions. The model therefore predicts that engaging in an activity that requires continuous self-regulation will result in ego depletion (Baumeister et al., 1998; Baumeister & Vohs, 2007; Inzlicht & Schmeichel, 2012). Because all self-regulatory capacities are assumed to utilize a finite set of resources, diminished capacities in one domain will affect the self-regulatory and decision-making abilities in another domain (Gailliot, Baumeister, et al., 2007). For example, engaging in affective self-regulation by suppressing an emotion may result in poor performance on a subsequent task requiring cognitive self-regulation.

Under conditions of ego depletion, people may have a reduced capacity to control their selfish impulses and to help other individuals in need. The degree to which helping behavior then declines may depend on the relationship with the person in distress. DeWall et al. (2008) explored the effect of diminished self-regulatory capacities on helping behavior in a series of studies. In their Study One, they induced ego depletion using a stimulus detection task. During the stimulus detection task, participants received two pages of journal text and were instructed to cross out every instance of the letter *e* on the first page of the text. On the second page,

participants in the control condition continued to cross out every instance of the letter *e*. Participants in the depletion condition, however, had to override the previously learned response by only crossing out the letter *e* under certain instances (i.e., they were instructed to not cross out the letter *e* when it was followed by a vowel or when a vowel was present two letters before the *e*). The researchers then gave participants six hypothetical scenarios depicting helping behavior directed towards strangers (e.g., donating money to a homeless person or lending a classmate their phone) and asked them to rate their willingness to help in each scenario. Participants in the depletion condition were less likely to offer help than participants in the control condition.

De Wall et al.'s Study Two investigated whether ingesting glucose could counteract the effects of ego depletion, as the glucose would (presumably) restore participants' energy and thus allow them to continue engaging their cognitive capacities (Gailliot, Baumeister, et al., 2007). Participants consumed either a glucose drink or a placebo sugar-free drink. Participants in the depletion condition watched a video with words at the bottom of the screen, and were instructed to inhibit their impulses by not reading the words. Participants in the control condition, on the other hand, were not instructed to inhibit their reading of the words at the bottom of the screen. Here, participants were given a bogus 'real-life' helping scenario depicting an individual in need. Again, participants in the depletion condition volunteered fewer hours than participants in the control condition. Furthermore, participants who consumed the glucose drink offered similar amounts of help regardless whether they had been assigned to the depletion or to the control condition. These findings support the prediction that ego depletion relies on a limited resource (as refueling participants' glucose levels counteracted ego depletion).

De Wall et al.'s Study Three aimed to assess whether conditions of self-regulatory depletion are less likely to influence helping behavior when the person in need of help is a family

member as opposed to a stranger. The stimulus detection task used in Study One was employed to manipulate ego depletion. After completing the depletion task, the researchers gave participants a hypothetical scenario where they imagined that either a stranger or a family member was about to be evicted from their residence. Ego depletion decreased willingness to help strangers, but willingness to help family members did not differ according to depletion condition. The authors concluded that it is easier to overcome the effects of depletion in response to an in-group (family) member compared to an out-group member (stranger) in distress (DeWall et al., 2008).

Effects of High Cognitive Demands on Empathic Responding

Although DeWall et al. (2008) established that ego depletion influenced participants' behavior, they did not establish whether depletion influenced participants' emotions towards the individuals in need of help. In fact, little research has been done to investigate the effects of diminished self-regulatory capacities on emotional responding, and findings from what research has been conducted is not conclusive.

Recent fMRI work by Wagner and Heatherton (2012) suggests depletion heightens neural correlates of emotional responding, particularly towards negative scenes. Those researchers did not, however, obtain participants' self-reported empathic responding, and thus could not ascertain the effects of diminished self-regulatory capacities on subjective emotional experiences. A study that collected participants' self-reported empathic responding suggests that a diminished cognitive capacity results in reduced empathy. Rameson et al. (2012) employed a within-subjects design to investigate the effects of cognitive load on empathy. Participants watched a series of images depicting individuals experiencing sadness (e.g., while attending a

funeral). Participants watched the images under three different conditions. In the first condition, participants were instructed to watch the images and respond to them naturally (i.e., they were told to react to the images as they would do if they were watching the images at home). In the second condition, participants were instructed to actively empathize while watching the images. In the third condition, participants were required to carry out a cognitively demanding task while they watched the images. Participants reported the least empathy for the images they saw while doing the cognitive task. However, the conditions for this study were not counterbalanced, and all participants completed the cognitive load task last. Hence, it is unclear whether their decreased empathy resulted from the effects of depleted cognitive load or the effects of general fatigue on responding.

In summary, even though research suggests that cognitively demanding situations may decrease empathic responding, findings are not conclusive. Furthermore, no study to date has investigated the effects of high cognitive demand on empathic responding towards racial out-group members.

The Autonomic Nervous System and Empathy

The various levels of processing involved in empathy make it a complex construct to investigate. At the physiological level, the empathic response results from processing in the autonomic nervous system (ANS), the endocrine system, and the cerebral cortex (Decety, 2011). Measuring activity in the ANS, in particular, can provide an index of the affective arousal component of empathy that is considered more objective and less subject to social desirability biases than self-report data (Neumann & Westbury, 2011). This section provides a brief overview of the role the ANS plays in emotion processing, specifically in relation to empathy.

The two divisions of the ANS, the sympathetic and parasympathetic nervous systems, work together to regulate cardiovascular activity by innervating cardiac muscles. The sympathetic nervous system (SNS) increases cardiac contractility and strength, raising the heart rate (HR) and blood pressure (BP). The parasympathetic system (PNS) acts either indirectly through activation of the baroreflex, or directly through control of the vagus nerve, to bring about cardiac deceleration and decrease the BP (e.g., Appelhans & Luecken, 2006; Rahman et al., 2011).

SNS activity drives the initial orientation response toward the person in distress (Avenanti et al., 2010; Jones & Gagnon, 2007) and may directly influence empathically-motivated helping behavior. For example, research has demonstrated that participants who showed similar skin conductance responses (SCR) while observing another in pain, and while experiencing pain themselves, were later more likely to act empathically by choosing to receive a painful stimulus instead of having the other person experience pain again (Hein, Lamm, Brodbeck, & Singer, 2011). PNS activity, on the other hand, regulates the affective arousal response, allowing for empathic concern and helping behavior rather than personal distress (Decety & Meyer, 2008; Jones & Gagnon, 2007).

Although the SNS and PNS are often thought to work in a dichotomous manner, the relationship between their activity is complex and in some cases, the systems may have co-activating or co-inhibitory influence on the heart (Berntson & Cacioppo, 2007; Berntson, Cacioppo, & Quigley, 1991; Kreibig, Wilhelm, Roth, & Gross, 2007). Thus, ANS arousal may be a multidimensional construct that compromises of varying degrees of SNS and PNS processing (Norman, 2015; Norman, Berntson, & Cacioppo, 2014).

The ANS response patterns for distinct emotional experiences depend on many methodological factors, including the method of emotion elicitation (Herrald & Tomaka, 2002). A few studies thus far have included ANS measures to capture affective arousal whilst experiencing empathy (Balconi & Bortolotti, 2012; Oliveira-Silva & Gonçalves, 2011; Raz et al., 2014). For example, Oliveira-Silva and Gonçalves, (2011) found HR increases in response to short videos of individuals displaying negative (e.g., sadness, loss, illness) and positive (e.g., enthusiasm, delight, achievement) emotions. These HR increases were associated with participants' degree of additive empathy (i.e., a higher order empathic understanding response as opposed to their reported affective arousal response) for the individuals depicted in the videos. In contrast to Oliveira-Silva and Gonçalves, (2011) who found no change in skin conductance level (SCL) responses accompanying self-reported empathic responses, Balconi and Bortolotti (2012) found both HR and SCL increases in response to empathy for situations depicting individuals in conflictual and cooperative interactions. Such findings suggest that the pattern of autonomic activity in empathic responding may differ according to the context in which empathy is elicited.

Empirical research on PNS correlations with self-reported empathic responding, support this notion (Raz et al., 2014). Specifically, Raz et al. (2014) found positive associations between PNS activity and reported empathy in response to video clips depicting loss that is expected to occur in the distant future (i.e., a mother telling her children she has a terminal illness). On the other hand, there were negative associations between PNS activity and reported empathy in response to video clips depicting loss that is expected to occur at any moment (i.e., where a child is about to be killed). These findings suggest the presence of differential SNS-PNS activation patterns that are determined by the type of loss depicted in the video clip (Kreibig, 2010).

In summary, research on ANS activity in response to empathy has not established any distinct ANS empathic correlates, but rather different patterns of responding depending on the method of emotion elicitation and nature of the study. Further research investigating both sympathetic and parasympathetic autonomic responding is required to aid an understanding of the physiology underpinning empathic responding.

Problem Identification and Aim

Empathy is a complex construct comprised of three interacting components: empathic arousal, understanding, and concern. Several studies show that each component process is susceptible to racial in-group biases (Drwecki et al., 2011; Neumann et al., 2013; Xu et al., 2009). Furthermore, feeling less empathic concern for a person of a different race can result in less motivation to help that person manage or cope with a distressing situation (Cuddy et al., 2007; Mathur et al., 2010). Because of the prominent role of executive functioning in regulating empathic concern and helping behavior, reduced self-regulatory capacities may also decrease the likelihood of helping a racial out-group member (DeWall et al., 2008). There have been no attempts to investigate the effects of high cognitive demands on physiological arousal, empathy, and helping behavior towards racial out-group members within a single research setting, however.

Therefore, the goal of this study was to investigate empathic reactions and helping behavior towards racial in-group and out-group members under conditions of low and high cognitive load. The legacy of apartheid in South Africa has resulted in racial divides that remain deeply entrenched in the economic, geographic, and social structure of our contemporary society (Nattrass & Seekings, 2001). Racial classification and consequent racial group identification

remain salient in intergroup relations. Thus, South Africa provides an appropriate setting to study the effects of cognitive processes on cross-racial empathy.

In the present study, film clips from the South African Truth and Reconciliation Commission (TRC) depicting White and Black individuals in emotional distress were used as empathy-eliciting stimuli. These scenarios are relevant to the context of the participants, and thus provide an ecologically valid means to elicit emotions and to study the patterns of ANS responding to emotional stimuli (Rottenberg, Ray, & Gross, 2007). In light of the literature reviewed above, I tested the following hypotheses:

1. There will be less empathic responding (as measured by self-reported empathic arousal, understanding, and concern, and by degree of physiological arousal) for racial out-group members than racial in-group members in distress.
2. Self-reported empathic responding will be influenced by degree of cognitive load: Empathic responding will be reduced for participants in a high-load condition compared to those in a low-load condition. Furthermore, physiological arousal will be influenced by degree of cognitive load.
3. There will be an interaction between cognitive load and racial group membership and empathic responding. The reduction in empathic responding under conditions of high cognitive load will be greater for racial out-group members than for racial in-group members.
4. There will be less helping under conditions of high cognitive load, and especially less helping directed towards racial out-group members.

As secondary exploratory aims, I will assess associations between the following variables:

1. Ethnic identification and self-reported empathy for and helping behavior directed toward racial in-group members.
2. Contact with racial out-group members (intergroup contact) and self-reported empathy and helping behavior toward racial out-group members.
3. Motivations to respond without prejudice and self-reported empathy and helping behavior toward racial out-group members.
4. Trait empathy and self-reported empathy and helping behavior toward racial out-group members.

Methods

Research Design and Setting

The study employed a 2 (racial group membership: Black, White) x 2 (cognitive load condition: Low Load, High Load) x 2 (target individual race: Black, White) mixed-factorial design. Each participant was assigned randomly to a cognitive load condition, and each participant then viewed neutral and emotion inducing video clips depicting Black and White individuals.

The outcome variables were measures of empathy and willingness to help, and physiological activity. Self-report outcome measures included ones related to empathic responding (i.e., arousal, understanding, and concern) and to helping behavior. Physiological activity in response to video clips of target individuals in distress (and in neutral situations) were captured by a combination of sympathetic and parasympathetic autonomic nervous system measures.

I also measured, using self-report questionnaires, individual differences in (a) ethnic identification, (b) intergroup contact, (c) motivations to respond without prejudice, and (d) trait empathy.

The study was conducted in a private laboratory room in the Department of Psychology at the University of Cape Town (UCT).

Participants

104 female undergraduate students (52 Black and 52 White; all aged 18-25 years) were recruited as participants through the Department of Psychology's Student Research Participation Program (SRPP). Each participant was assigned, pseudo-randomly so that there were equal numbers of Black and White participants in both conditions, to either a Low Load (n = 52) or a High Load (n = 52) condition.

Eligibility criteria. Potential participants completed a sociodemographic questionnaire to confirm their eligibility (see Appendix A). The following eligibility criteria were applied strictly. First, the study was limited to female participants to control for the confounding influence of biological sex on empathic responding, (Women generally, are more empathic than men; Baron-Cohen & Wheelwright, 2004; Christov-Moore et al., 2014; de Vignemont & Singer, 2006). Second, participants were South African citizens who grew up in this country. Third, only participants who self-identified as first-language Xhosa-speaking and Black African, or first-language English speaking and White, participated. This criterion ensured that participants belonged to the same racial and language groups as the target individuals depicted in the video clips. Third, all participants reported fluency in English to confirm their ability to follow instructions, which were administered in English. Fourth, any individual diagnosed with or under

treatment for any respiratory, cardiovascular, or psychiatric disorder was excluded from participation. Psychiatric disorders may affect emotion processing in response to the video clips (Rottenberg, Kasch, Gross, & Gotlib, 2002), and cardiovascular and respiratory disorders may affect physiological responding (Kreibig et al., 2007). Finally, given the negative effects of traumatic brain injuries on executive functions (Caeyenberghs et al., 2014), any potential participant who experienced a head injury severe enough to result in loss of consciousness was excluded from participation in the study. Participants were asked to refrain from any caffeinated and alcoholic beverages for 3 hours before the experiment. Similarly, they were asked to avoid any strenuous exercise on the day of the experiment.

Materials

Video clips. Participants viewed two neutral video clips and two emotional video clips. Each 2-min video clip was displayed, using E-Prime version 2.0 (Psychology Software Tools, Inc., Pittsburgh, USA), on a 21-inch computer monitor.

The two neutral video clips were extracts from interviews with academic staff members from the UCT Department of Medicine. One clip showed a Black female and the other a White female, both discussing the first-year curriculum at the medical faculty.

The emotion inducing video clips were extracts from the South African TRC hearings. One clip depicted a Black woman and the other a White woman. Both women were discussing their experience of loss and bereavement due to apartheid violence. The two women were similar in age, and both lost an immediate family member: The Black woman her husband, and the White woman her daughter.

The video clips were selected based on the results of a pilot study conducted on a racially diverse sample of female UCT undergraduate students (see Appendix B). Participants in that pilot study were required to view a selection of neutral and emotion inducing video clips and rate their empathic responding on each video clip. The pilot study ratings confirmed that both neutral video clips elicited no emotional responses in participants. In addition, the two emotional video clips selected were matched on their ratings of empathic concern, as well as their content.

Cognitive load task. Cognitive load was manipulated by administering a version of the Stroop task, adapted and used previously by Shelton et al., (2011). The task was administered via E-Prime version 2.0.

In this task, the words *red*, *green*, *blue*, and *yellow* were displayed one at a time, on the computer monitor. Each word was displayed in either a red, green, blue, or yellow font color. Participants were instructed, via text on the computer monitor, to place their dominant hand on the keyboard, resting their fingers on the letters *C* (representing the color red), *V* (representing the color blue), *B* (representing the color yellow), and *N* (representing the color green), respectively. Colored stickers matching the representing colors were placed on each of the keys.

Participants were instructed to press, as quickly and as accurately as possible, the key matching the font color of each presented word.

The task itself consisted of matched and unmatched trials. On matched trials, the color of the font matched the word itself (e.g., the word *red* printed in red font). On unmatched trials, the word and the font color were incongruent (e.g., the word *green* printed in yellow font).

Participants in the Low Load condition completed a version of the Stroop task where 100% of the trials were matched. Each trial began with a 650-ms fixation cross followed by the stimulus word. Messages appeared at random intervals stating the percentage of the task

participants had completed (e.g., "You have completed 5% of the task"). No error messages appeared when participants responded incorrectly. Participants in this condition were therefore able to respond to the color of the words without engaging in any self-regulation.

Participants in the High Load condition completed a version of the Stroop task where 20% of the trials were matched. The task ran in sets of five randomly distributed trials, with four unmatched and one matched trial in each set. Each trial began with a 450-ms fixation cross, followed by the stimulus word. Messages appeared at random intervals throughout the task encouraging participants to respond at a rapid rate (e.g., "Keep going as fast as you can"). In addition, if participants made an error, a message stating "Error!" appeared and participants had to press the correct response key before being allowed to continue with the task.

In both the Low and High Load conditions, the task ran for a total of 7-min. Trials were divided into ten blocks, and each block ran for a pre-allocated period of time which varied in length. Participants completed a 7-item practice trial before commencing the first block of the Stroop task.

The version of the Stroop task used in this study was piloted on a separate sample of 32 Black and White female participants (n = 16 Low Load; n = 16 High Load; see Appendix C). Participants in the pilot study rated the High Load task as significantly ($p < .001$) greater in difficulty and effort required than the Low Load task. Participants who completed the High Load task also made a greater number of errors ($p = .08$) and had a slower mean reaction time ($p = .05$) than participants who completed the Low Load task.

The Stroop task has been used frequently to induce conditions of high cognitive load (Hagger, Wood, Stiff, & Chatzisarantis, 2010). The unmatched trials of the Stroop task require participants to inhibit a learned response by stating the color of the word instead of reading the

word itself. Participants therefore exercise self-control and utilize self-regulatory capacities in order to complete the task (Govorun & Payne, 2006).

Cognitive load manipulation checks. After completing the cognitive load task, participants completed a brief self-report and behavioral manipulation check to assess the effect of the cognitive load manipulation on their self-regulatory capacities.

Self-report manipulation check. Impaired performance on a cognitive load task is associated with perceptions of high fatigue, high task difficulty, decreased levels of attention, and an increased desire to quit (Baumeister et al., 1998). A 7-item manipulation check questionnaire adapted from Muraven, Rosman, and Gagné (2007) and Webb and Sheeran (2003), assessed participants' ratings of the Stroop task according to: (i) difficulty, (ii) effort required, (iii) desire to quit, (iv) obligation to continue, (v) level of attention required, (vi) level of fatigue, and (vii) level of motivation to continue with the rest of the experiment. Participants responded to each item on a 7-point Likert-type scale ranging from 1 (e.g., *very easy*) to 7 (e.g., *very difficult*; Appendix D).

Behavioral manipulation check. Participants completed the basic condition of the Delis-Kaplan Executive Functioning Scale (DKEFS; Delis, Kaplan, & Kramer, 2001) Design Fluency subtest, as a performance-based manipulation check. Instructions for the task were administered orally, following conventions of the test manual. Furthermore, a page listing the task rules was placed in front of participants to remind them of the instructions. Participants were first given a practice item featuring three squares, each square containing an array of five dots. Participants were told to make a different design in each of the three squares, using four straight lines. Each line had to touch at least another line at a dot (the examiner demonstrated this rule by drawing

two lines on the practice sheet), and lines were allowed to cross. They then practiced the task, any errors or misunderstandings of the rules were corrected immediately.

After completing the practice trial, participants were presented with a sheet containing 35 sets of the five-dot array. They were instructed to make as many different designs as possible within 60s, and the task rules were repeated to them. No further prompting or assistance was given after this point. If participants started a design at the 60s time limit, they were allowed to complete that design.

The DKEFS Design Fluency task requires participants to produce novel designs that adhere to a set of rules while inhibiting designs that they have already produced. Hence the task requires self-regulation (Schmeichel, Demaree, Robinson, & Pu, 2006). According to the limited-resource theory, engaging in a self-regulatory task consumes one's cognitive resources, leading to a decline in performance on subsequent self-regulatory tasks (Baumeister et al., 1998). Therefore, participants in the High Load condition are assumed to have utilized their self-regulatory executive capacities in the unmatched Stroop task, resulting in a poorer performance on the Design Fluency task compared to participants in the Low Load condition.

Behavioral responses. I investigated participants' (a) self-reported empathic ratings in response to each video clip, and (b) willingness to help the individuals depicted in the emotional video clips.

Self-reported empathic responding. After viewing each video clip, participants rated their empathic responding using visual analogue scales (VAS) in E-Prime version 2.0. The VAS is a continuous measure with ratings that range from 0 (e.g., *calm/relaxed*) to 10 (e.g., *aroused/stressed*). Higher ratings indicate greater empathic responding. I obtained ratings for each empathic component process, that is, (a) how much subjective arousal the participant felt

(empathic arousal), (b) how much distress the target individuals appeared to be experiencing (empathic understanding), and (c) how sad participants felt for the target individuals (empathic concern).

Self-reported willingness to help. The following measure assessed participants' willingness to help the individuals depicted in the emotional video clips. After watching the emotional video clips, participants were presented with a bogus document titled *UCT Social Responsibility Initiative* (see Appendix E). The document presents two short vignettes (one for each individual depicted in the emotional video clips), describing each individual's involvement with RECON-SA, a fictional organization that promotes development and reconciliation in South Africa. The Black female is said to co-ordinate development projects for the organization. The White female is said to run workshops for RECON-SA. The document gives participants the opportunity to assist the individuals depicted in the video clips by contributing to their cause. Participants may contribute by volunteering time, or by making a financial donation, to each individuals' cause. A note on the document stated that donations ranged from R1-R100, and that hours volunteered range from 1-50.

Upon presenting the document, I informed participants that I (the researcher) was not directly involved with the UCT Social Responsibility Initiative or with RECON-SA, but was asked by the initiatives to present the document to the participants. Participants were given a cover story that RECON-SA had been going through financial difficulties, and therefore had approached the UCT Social Responsibility Initiative for assistance. Participants were informed that if they did wish to make a contribution, they were to fill out the document and provide their contact details. To ensure anonymity of the helping behavior data, the contact detail forms were on a different page to the helping behavior questionnaires.

Physiological measures. Participant electrocardiogram (ECG), impedance cardiogram (ICG), and skin conductance level (SCL) responses were recorded using the Vrije Universiteit Ambulatory Monitoring System (VU-AMS, Vrije Universiteit, Amsterdam, Holland). Seven pre-gelled Ag/AgCl electrodes were used to obtain the ECG and ICG signal recordings. Electrode placement configuration was done according to guidelines in the VU-AMS manual ("Data Analysis and Management Software for the Vrije Universiteit Ambulatory Monitoring System," 2013). The first ECG electrode was placed below the right collarbone. The second ECG electrode was placed below the right lower ribs. The third ECG electrode was placed on the left side of the body over the ninth rib. The first ICG electrode was placed between the two collar bones, on the sternum. The second ICG electrode was placed at the bottom of the sternum. The third and fourth ICG electrodes were placed on the back, one 3 cm above the first ICG electrode and the other, 3 cm below the second ICG electrode. Signals were sampled at 1 kHz.

Electrodes attached to participants' index and ring fingertips on their non-dominant hands captured their SCL in response to each video clip. Sampling frequency was set at 10Hz. Ag-AgCl finger electrodes filled with 0.5% saline gel were used. Participants were instructed to keep their non-dominant hands flat on the table during the study and to refrain from moving their non-dominant hands.

Signal markers were sent from E-Prime to the VU-AMS device to designate the baseline recording and each 2-min video clip viewing period. I extracted heart rate (HR) and pre-ejection period (PEP) scores for each 2-min video clip viewing period from the ECG and ICG signal scores, and skin conductance level (SCL) scores from the SCL signal. Furthermore, low frequency (LF), high frequency (HF), and total frequency (TF) spectral frequencies (the sum of LF and HF power) were obtained by means of autoregressive analyses (AR).

Individual difference measures. I used a set of questionnaires to assess participants' (a) ethnic identification, (b) intergroup contact, (c) motivations to respond without prejudice, and (d) trait empathy.

Ethnic identification. The Multi-group Ethnic Identity Measure (MEIM; Phinney, 1992) measured participants' level of identification with their racial or ethnic group. This 12-item scale (see Appendix F) assesses two components of ethnic identity. The first component, *identity search*, assesses the cognitive components involved in identification with a particular racial group. An example of an item related to that component is, "I spend time learning about my group and its traditions." The second component, *affirmation, belonging, and commitment*, assesses the affective aspects of racial group identification. An example of an item related to that component is, "I feel very proud to be a member of my ethnic group." Participants responded to each item using a Likert-type scale with options ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

The MEIM has good internal consistency (α =.80) and has been validated in various racial groups, including White Americans, Black Americans, Hispanic Americans, Black South Africans, Colored South Africans, and White South Africans (Avery, Tonidandel, Thomas, Johnson, & Mack, 2007; Smith, Stones, & Naidoo, 2003). It can therefore be used to measure racial group identification in both Black and White participants in South Africa. I adapted the original instrument's racial group identification labels for use in South Africa by changing the labels 'African-American' and 'Caucasian American' to 'Black' and 'White', respectively.

Intergroup contact. A 10-item scale adapted from Hewstone, Judd, and Sharp, (2011) assessed racial group contact (see Appendix G). The scale assessed quantity of intergroup contact, quality of intergroup contact, and direct and extended intergroup friendship. Four items

assessed contact quantity, two items assessed contact quality, two items assessed direct intergroup friendship, and two items assessed extended intergroup friendship. An example of an item related to intergroup contact is, "How often do you interact with Black people at university?" *Quantity of contact* items measured how often participants were in contact with racial out-group members in university and in their home towns. *Quality of contact* items measured the nature of intergroup contact. *Direct cross-group friendship* items assessed the portion of participants' friends who are racial out-group members. *Extended cross-group friendship* items assessed whether participants' friends have friends who are racial out-group members. Participants' responses were measured on a 7-point Likert-type scale (e.g., 1 = cooperative, 7 = competitive). The scale was adapted to measure intergroup contact on both Black and White participants. That is, Black participants were given a version of the scale that assessed their intergroup contact with White individuals, whilst White participants were given a version of the scale that assessed their intergroup contact with Black individuals.

Motivations to respond without prejudice. The Internal Motivation to Respond without Prejudice and External Motivation to Respond without Prejudice Scale (IMS/EMS; Plant & Devine, 1998) measures those varying sources of motivation to act without prejudice. This 10-item scale (see Appendix H) consists of two subcomponents that measure, respectively, internal/personal and external/social motivations to respond without prejudice. An example of an *internal motivation* item is "Being a non-prejudiced individual is of great personal importance to me." An example of an *external motivation* item is "Social pressures influence my likelihood of showing prejudice." Each item is rated on a Likert-type scale ranging from 1 *(strongly disagree)* to 9 *(strongly agree).* The higher the score, the greater that type of motivation. I adapted the scale to measure Black and White participants' motivations to respond without prejudice toward their

racial out-group. Thus, Black participants provided responses on their motivations to act without prejudice toward White people, and White participants provided responses on their motivations to act without prejudice toward Black people.

The scale's developers report that, overall, it shows good internal consistency for both the IMS (α = .81) and the EMS (α = .80) subcomponents. The scale also has a high test-retest reliability (r_{IMS} = .77, r_{EMS} = .60). Correlations between the IMS/EMS and other measures of prejudice indicate that the scales have good convergent and discriminant validity (Plant & Devine, 1998).

Trait empathy. The Questionnaire of Cognitive and Affective Empathy (QCAE; see Appendix I) is a measure of trait empathy (Reniers, Corcoran, Drake, Shryane, & Völlm, 2011). Each of the scale's 31 items requires a response on a 4-point Likert-type scale *(strongly agree*; *slightly agree*; *slightly disagree*; or *strongly disagree)*. The scale is divided into five subscales: perspective taking, online simulation, emotion contagion, proximal responsivity, and peripheral responsivity. The perspective taking and online simulation subscales assess cognitive empathy. The emotion contagion, proximal responsivity, and peripheral responsivity subscales assess affective empathy. *Perspective taking* measures the ability to see things from another's point of view (e.g., "I can easily predict what another person might want to do"). *Online simulation* measures the attempt to imagine another's feelings in order to take their perspective (e.g., "I try to understand another person's feelings before I do something"). *Emotion contagion* measures the mirroring of emotions in others (e.g., "The emotions of the people around me strongly influence my emotions"). *Proximal responsivity* measures the affective empathic response to others (e.g., "I often feel upset when I see someone in pain"). Finally, *peripheral responsivity*

measures the affective response to others in a detached context (e.g., "I tend to get very emotional when watching a film").

The QCAE's developers report that it is reliable ($\alpha = .85$, $\alpha = .72$, $\alpha = .83$, $\alpha = .65$, and $\alpha = .70$ for each of the five subscales, respectively). The strong correlation between the QCAE and the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) indicates that the former has strong convergent validity. Furthermore, significant correlations between QCAE scores and scores on questionnaires that assess empathic anger, impulsivity, aggression, psychopathy, and Machiavellianism provide evidence for its construct validity (Reniers et al., 2011).

Procedure

Figure 1 provides an outline of the experimental protocol. Each participant experienced the experimental protocol individually. Upon arrival at the laboratory, participants were seated in front of a computer and provided with a brief outline of the protocol. To mask the research hypotheses, I told participants that the study was on "The different physiological responses to cognitive processing and person processing." Participants were then given a brief explanation on how the VU-AMS device records physiological data, and were allowed to read and sign the informed consent document (see Appendix J).

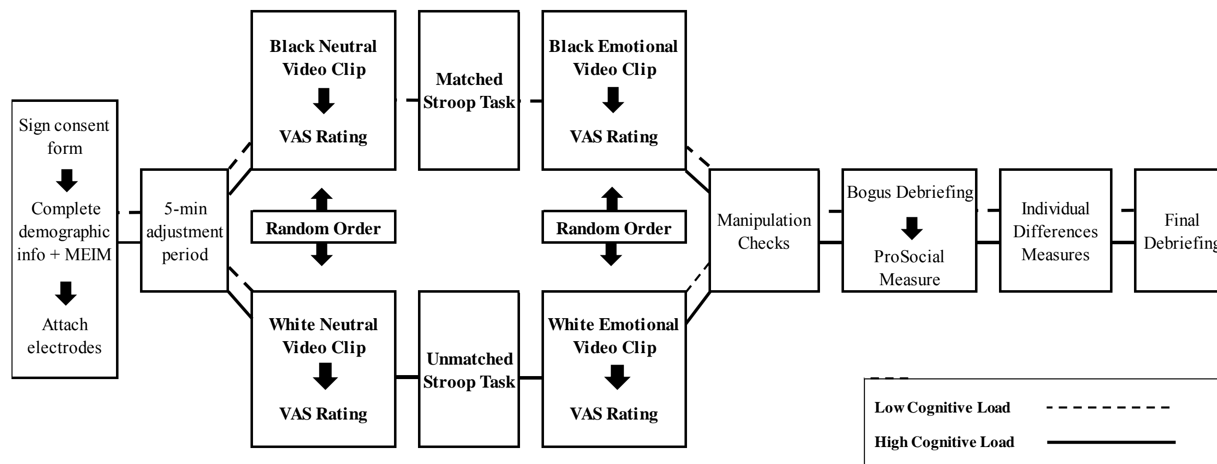

Figure 1. Outline of experimental procedure. The entire protocol took 90-min to complete.

To assign participants to the Low or High Load condition, an online randomizing software program (Urbaniak & Plous, 2013) generated two sets of 52 numbers, with each number in each set being either 1 or 2 (where 1 corresponded to the High Load condition and 2 to the Low Load condition). The first set of numbers allocated Black participants to their experimental condition and the second set allocated White participants to their experimental condition.

Participants' skin was then cleaned with surgical spirits and the electrodes were attached to the participant's chest and back to obtain ECG and ICG signal recordings. I also attached SCL electrodes to the participant's non-dominant index and ring fingertips. Participants were then fitted with headphones, and were given the sociodemographic questionnaire and MEIM scale to complete, while the ambulatory signal recording was set up.

Once participants completed the forms, I obtained a 5-min baseline VU-AMS recording. Participants were instructed to remain still, keep their eyes open, and to refrain from talking during the recording period. I asked them to relax and to empty their mind of any thoughts during the baseline recording. Instructions for the baseline recording were also displayed though

E-Prime. After the baseline recording, instructions displayed via E-Prime informed participants about the VAS scale that was to be used in the rest of the experiment. Participants were given a practice rating scale where they were instructed to rate how they felt "At this moment." They then viewed the two neutral video clips. A VAS appeared after each 2-min clip so that participants could rate the clip in terms of their empathic arousal, understanding, and concern. Clips were randomized via E-Prime to avoid order effects.

After each neutral video clip had played, instructions on how to complete the Stroop task were displayed on the screen. Participants completed either the simpler (Low Load) or cognitively demanding (High Load) version of the Stroop task, depending on the cognitive load condition to which they are assigned. The self-report manipulation check was placed next to participants for them to complete after the Stroop task.

Immediately after the Stroop task, participants completed the self-report manipulation check and the DKEFS Design Fluency behavioral manipulation check.

Participants then viewed the two emotional video clips, also presented in a random order. Before each video clip, a brief paragraph displayed on the screen provided context regarding the content of the clip. After each clip, participants completed VAS ratings of empathy for the clip. Once participants had viewed both emotional video clips, they received a bogus debriefing and were informed that the formal testing was complete.

Participants were then presented with the "Social Responsibility Initiative" helping behavior measure and were told that the individuals in the emotional video clips were in need of assistance. After completing the helping behavior measure, participants completed the intergroup contact measure, IMS/EMS, and QCAE, in that order. They then received a full debriefing, where they were informed of the full aims of the study, as well as the non-authenticity of the

helping behavior measure. In addition, participants were asked if they doubted the authenticity of the helping behavior measure. Finally, they were given the opportunity to ask any questions or make any comments regarding the experimental procedure.

Data Management and Statistical Analyses

I analyzed all data using SPSS version 22, with the threshold for statistical significance set at α =.05.

Ambulatory signal scoring. The Vrije Universiteit Data Analysis and Management Software 3.5 software suite (VU-DAMS; Vrije Universiteit, Amsterdam, The Netherlands) was used to transform the ECG and ICG signals for further statistical analyses. The resulting waveforms were inspected for implausible readings. Artefacts in the data were corrected, and where possible, implausible signal scores were discarded.

I extracted following indicators of ANS activity from the ECG and ICG signal recordings: *heart rate (HR)*, *pre-ejection period (PEP)*, and *skin conductance level (SCL)*. HR scores provide an indication of overall cardiac activity; PEP and SCL scores provide an index of the electrodermal and beta adrenergic SNS activity, respectively. Low frequency (LF) and high frequency (HF) components of heart rate variability were also obtained by autoregressive analyses. *HF power* provides an index of PNS activity. *LF power*, although not as well understood is thought to provide an index of baroreflex function (Goldstein, Bentho, Park, & Sharabi, 2011).

To calculate PEP scores, the ensemble-average ICG waveform for each label was scored manually following guidelines given by Sherwood et al., (1990). The PEP score was defined as

the time in milliseconds from the onset of the Q-wave on the ECG waveform, to the onset of the B-point on the ICG waveform.

To obtain mean physiological reactivity scores, I subtracted the mean scores for the neutral video clips from the mean scores for the emotional video clips for each physiological measure (i.e., HR, PEP, and SCL).

To obtain LF and HF heart rate frequency components, autoregressive (AR) analyses were conducted using the Kubio HRV software package from the Biomedical Signal Analysis Group (Department of Applied Physics, University of Kuopio, Kuopio, Finland). A model order of 15, and 5 Hz interpolation rate was used to obtain LF (.04-.15Hz), HF (.15-.40Hz), and TF (.04-.40Hz) power values for each video clip viewing period.

Emotion elicitation confirmation. To confirm that the emotional video clips elicited a greater empathic response than the neutral video clips, dependent-samples *t*-tests compared the VAS ratings of empathic arousal, understanding, and concern for the neutral and emotional video clips.

Cognitive load manipulation checks. Mann Whitney-U tests compared, across load condition, the participants' self-report ratings of (i) task difficulty, (ii) effort required, (iii) desire to quit, (iv) obligation to continue, (v) level of attention, (vi) level of fatigue, and (vii) level of motivation after completing the Stroop task.

Independent-samples *t*-tests compared the number, across load condition, of novel designs created on the DKEFS Design Fluency subtest.

Hypothesis testing. To test Hypotheses 1, 2, and 3, I used the following sets of analyses. Three 2 x 2 x 2 mixed-design ANOVAs assessed the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target

individual (Black vs. White) on VAS scores for empathic arousal, understanding, and concern. Similarly, three 2 x 2 x 2 mixed-design ANOVAs assessed the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs. White) on measures of HR, PEP, and SCL reactivity scores. Finally, three 2 x 2 x 2 mixed-design ANOVAs assessed the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs. White) on measures of LF, HF, and TF power during the emotional video clip viewing periods.

To test Hypothesis 4, a log linear analysis assessed the interaction between racial group membership of participant, cognitive load condition, and likelihood of offering help and two separate Chi-squared analyses assessed the likelihood of helping according to cognitive load condition and racial group membership of participant. Furthermore, a 2 x 2 x 2 mixed-design ANOVA assessed the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs. White) on *z*-scores combining the number of hours/Rands (ranging from 0-50 hours and 0-100 Rands) participants offered to volunteer/donate to each target individual's cause.

Exploratory aims. Finally, as secondary exploratory aims, Spearman's Rank correlation analyses investigated the strength of the relationship between MEIM scores and (a) VAS scores for empathic responding toward racial in-group members, and (b) *z*-scores on the amount of help offered toward racial in-group members. In addition, Spearman's Rank correlation analyses investigated the strength of the relationship between (a) intergroup contact with racial out-group members, IMS/EMS, and trait empathy scores and (a) VAS scores for empathic responding toward racial out-group members, and (b) helping behavior toward racial out-group members.

Ethical Considerations

The research followed the ethical guidelines outlined by the UCT Codes for Research. Data collection commenced only after ethical approval was obtained from the UCT Department of Psychology Research Ethics Committee. Participants provided informed consent prior to commencing the study. Participation was voluntary, and participants had the right to withdraw from the study at any stage without penalty. Participant responses were anonymous because questionnaires were identified using participant numbers only. Data collected were used for research purposes only, and remain confidential.

Although the study did involve a degree of deception in order to disguise the true research hypotheses, participants did not experience any harm as a result of this deception, and received a full debriefing at the end of the experimental procedure. The contact details of the UCT Student Wellness Centre were made available if students were emotionally affected by the emotional content video clips.

Finally, I (a female researcher) attached the electrodes onto participants in a private section of the laboratory to avoid any discomfort for research participants (who, recall, were all female).

Results

Testing the Efficacy of the Emotion Elicitation Task

To confirm that the emotional video clips of Black and White individuals in distress elicited significantly more empathy than the neutral video clips, I performed dependent samples *t*-tests on VAS scores for each empathic component (i.e., arousal, understanding, and concern).

Table 1 indicates that the ratings for each empathic component were significantly smaller in the neutral relative to the emotional video clips, for both Black and White target individuals.

Table 1
Self-Report Empathy Ratings for Neutral and Emotional Video Clips (N = 104)

Empathic component	Target race	Type of clip		*Significance test*		
		Neutral	Emotional	*t*	*p*	*D*
Arousal	Black	2.53 (1.67)	7.83 (1.32)	-26.67	< .001***	-2.59
	White	2.97 (1.78)	7.32 (1.53)	-20.12	< .001***	-1.95
Understanding	Black	1.95 (1.75)	9.13 (0.76)	-38.39	< .001***	-3.73
	White	3.14 (2.11)	8.60 (1.10)	-24.42	< .001***	-2.37
Concern	Black	1.72 (1.55)	8.77 (1.10)	-37.93	< .001***	-3.70
	White	2.61 (2.05)	8.08 (1.78)	-21.90	< .001***	-2.12

Note. VAS scores range from 0 (e.g., *calmed/relaxed*) to 10 (e.g., *aroused/stressed*). Descriptive statistics presented are means, with standard deviations in parentheses. Degrees of freedom were 103 for each comparison.
***$p < .001$.

Testing the Efficacy of the Cognitive Load Manipulation

Self-report manipulation check. Mann-Whitney *U* tests (see Table 2) confirmed that participants in the High Load condition reported diminished self-regulatory capacities. In particular, they reported experiencing significantly greater levels of task difficulty, effort required, attention required, fatigue, and motivation to continue with the rest of the experiment than did participants in the Low Load condition.

Table 2
Self-Report Ratings Following the Low and High Load Conditions on 7-item Likert-type Rating Scales (N = 104)

	Median ratings		Significance test		
Item	Low Load	High Load	*U*	*p*	*r*
Difficulty	2.00	3.00	941.00	.003**	-.27
Effort required	2.50	4.00	718.50	< .001***	-.41
Desire to quit	4.00	4.00	1335.00	.46	-.01
Obligation to continue	4.00	5.00	1145.50	.09	-.13
Level of attention	6.00	7.00	986.00	.01**	-.25
Fatigue	3.00	4.00	1084.50	.04*	-.17
Level of motivation	6.00	6.50	975.50	.01**	-.25

Note. For each self-report item, ratings ranged from 1 (e.g., *very easy*) to 7 (e.g., *very difficult*).
*$p < .05$. **$p < .01$. ***$p < .001$.

Behavioral manipulation check. Although the distribution of these data did not meet the assumption of normality, I conducted independent-samples *t*-tests because these are robust to violations of normality (Wilcox, 2005).

On average, participants in the Low Load condition ($M = 9.37$, $SD = 2.98$) produced a greater number of novel designs on the DKEFS Design Fluency task than did participants in the High Load condition ($M = 8.48$, $SD = 2.97$). The analyses did not detect a significant between-group difference, however, $t(102) = 1.52$, $p = .07$, $r = .15$.

Testing Hypotheses One, Two, and Three

According to hypothesis one, there will be less empathic responding (as measured by self-reported empathic arousal, understanding, and concern, and by degree of physiological arousal) for racial out-group members than for racial in-group members. I tested hypothesis one by analyzing the interaction between racial group membership of the participant and race of target individual in the video clip on (a) VAS empathic responding and (b) physiological responding. Hypothesis two states that empathic responding (measured by self-reported empathic

responses and physiological responses) will be influenced by degree of cognitive load. The main effect for cognitive load condition on (a) VAS empathic responding and (b) physiological responding tested the second hypothesis. Finally, hypothesis three states that there will be an interaction between cognitive load and racial group membership on empathic responding. I tested hypothesis three by analyzing the three-way interaction between racial group membership of the participant, cognitive load condition, and race of the target individual in the video clip on (a) VAS empathic responding and (b) physiological responding.

Self-reported empathic responding. Table 3 presents the descriptive statistics for VAS empathic arousal, understanding, and concern scores in response to the emotional video clips. Because the distributions of the data were negatively skewed, I used log transformations on the reverse scores before conducting three separate 2 (racial group membership of participant: Black vs. White) x 2 (cognitive load condition: Low vs High) x 2 (race of target individual: Black vs White) mixed-design ANOVAs.

Table 3

Self-Report Empathic Responding to the Emotional Video Clips (N = 104)

Group membership	Empathic component	Target race	Cognitive load condition	
			Low	High
Black participants	Arousal	Black	7.85 (1.57)	7.83 (1.44)
		White	7.19 (1.66)	7.28 (1.95)
	Understanding	Black	9.31 (0.67)	9.24 (0.67)
		White	8.96 (1.02)	8.81 (1.29)
	Concern	Black	8.77 (1.20)	8.73 (0.96)
		White	7.87 (2.11)	7.90 (1.94)
White participants	Arousal	Black	7.90 (1.04)	7.76 (1.24)
		White	7.36 (1.02)	7.45 (1.41)
	Understanding	Black	9.05 (0.77)	8.94 (0.89)
		White	8.44 (1.05)	8.18 (0.89)
	Concern	Black	8.73 (1.05)	8.83 (1.23)
		White	8.20 (1.24)	8.33 (1.78)

Note. VAS scores range from 0 (e.g., *calmed/relaxed*) to 10 (e.g., *aroused/stressed*). Data presented are means, with standard deviations in parentheses.

The analysis detected a significant main effect for race of the target individual. On average, both Black and White participants reported greater empathic arousal, understanding, and concern for the Black target individual than for the White target individual, $F(1, 100) = 12.87$, $p = .001$, $\eta_p^2 = .11$, $F(1, 100) = 40.20$, $p < .001$, $\eta_p^2 = .29$, and $F(1, 100) = 20.00$, $p < .001$, $\eta_p^2 = .17$, respectively. These findings follow the same trend as seen in the earlier conducted pilot study, where (although non-significant) empathic concern ratings were higher for the Black ($M = 8.24$, $SE = 1.06$) than the White target individual ($M = 7.92$, $SE = 1.39$; see Appendix B).

The analysis detected no significant main effect of racial group membership of participant in terms of empathic arousal, understanding, or concern, $F(1, 100) < .01$, $p = .99$, $\eta_p^2 < .01$, $F(1, 100) = 3.28$, $p = .07$, $\eta_p^2 = .03$, and $F(1, 100) = 0.39$, $p = .53$, $\eta_p^2 < .01$, respectively.

The analysis also detected no significant main effect of cognitive load condition in terms of empathic arousal, understanding, and concern, $F(1, 100) = 1.70$, $p = .20$, $\eta_p^2 = .02$, $F(1, 100) = 1.46$, $p = .23$, $\eta_p^2 = .01$, and $F(1, 100) = 1.21$, $p = .27$, $\eta_p^2 = .01$, respectively.

The analysis detected a significant interaction between racial group membership of participant and race of target individual in terms of empathic understanding, $F(1, 100) = 5.89$, $p = .02$, $\eta_p^2 = .06$, but not in terms of empathic arousal and concern, $F(1, 100) = 1.67$, $p = .20$, $\eta_p^2 = .02$, and $F(1, 100) = 0.27$, $p = .61$, $\eta_p^2 < .01$, respectively. Black participants reported similar levels of empathic understanding toward the Black target individual ($M = 9.28$, $SE = 0.11$) as the White target individual ($M = 8.88$, $SE = 0.15$), whereas White participants reported greater empathic understanding toward the Black target individual ($M = 8.99$, $SE = 0.11$) than the White target individual ($M = 8.31$, $SE = 0.15$).

There were no significant two-way interactions between (a) racial group membership of participant and cognitive load condition and (b) cognitive load condition and race of target individual, and no significant three-way interaction between racial group membership of participant, cognitive load condition, and race of target individual on ratings of empathic arousal, understanding, and concern ($Fs < 2.37$, $ps > .13$, η_p^2s $< .02$).

Physiological responding. I excluded all physiological data for five Black participants (one in the High Load condition and four in the Low Load condition) due to equipment malfunction. Furthermore, SCL data were not collected for one Black participant in the High Load condition. The physiological data sample therefore consisted of 47 Black participants (n = 22 in the Low Load condition and n = 25 in the High Load condition) and 52 White participants (n = 26 in each condition).

Mean physiological reactivity scores were obtained by subtracting the mean scores for the neutral video clips from the mean scores for the emotional video clips for each physiological measure (i.e., HR, PEP, and SCL). Figure 2 shows the physiological reactivity scores (from neutral to emotional clips) in response to Black and White target individuals, in the Low Load and High Load conditions.

Three 2 x 2 x 2 mixed-design ANOVAs assessed the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs. White) on HR, PEP, and SCL reactivity scores.

HR. Across the entire sample, heart rate (measured in beats per minute) decreased significantly from the neutral video clips (Black target individual: M = 78.49, SE = 1.18; White target individual M = 78.08, SE = 1.18) to the emotional video clips (Black target individual: M = 76.29, SE = 1.13; White target individual M = 75.61, SE = 1.11) for both the Black target individual, $t(98) = 7.53$, $p < .001$, and the White target individual, $t(98) = 7.70$, $p < .001$ video clip viewing conditions.

The analysis detected no significant main effect of target individual's race (Black target individual: M = -2.21, SE = 0.29; White target individual: M = -2.49, SE = 0.32), $F(1, 95) = 1.30$, $p = .26$, $\eta_p^2 = .01$. Similarly, the analysis detected no significant main effect of racial group membership of participant (Black participants: M = -2.20, SE = 0.41; White participants: M = -2.50, SE = 0.39), $F(1, 95) = 0.28$, $p = .60$, $\eta_p^2 < .01$. There was also no significant main effect of cognitive load condition (Low Load condition: M = -2.65, SE = 0.40, High Load condition: M = -2.05, SE = 0.39), $F(1, 95) = 1.14$, $p = .29$, $\eta_p^2 = .01$.

Furthermore, the analysis detected no significant two-way interactions (between racial group membership of participant and cognitive load condition, cognitive load condition and race

of target individual, and racial group membership of participant and race of target individual), and no significant three-way interaction (between racial group membership of participant, cognitive load condition, and race of target individual), *Fs* < 2.92, *ps* > .09, η_p^2s < .03.

PEP. For all participants, PEP values did not change from the neutral video clip (*M* = 106.31, *SE* = 1.43) to the emotional video clip (*M* = 107.01, *SE* = 1.38) for the Black target individual [*t*(98) = -1.25, *p* = .21]. In contrast, PEP values increased from the neutral video clip (*M* = 106.07, *SE* = 1.43) to the emotional video clip (*M* = 107.67, *SE* = 1.43) for the White target individual [*t*(98) = -3.17, *p* = .002].

The analysis detected a significant main effect of target individual's race, *F*(1, 95) = 5.30, *p* = .02, η_p^2 = .05. Specifically, PEP change score values were shorter for the Black target individual (*M* = 0.68, *SE* = 0.56) than for the White target individual (*M* = 1.54, *SE* = 0.50).

The analysis did not detect a significant main effect for racial group membership of participant (Black participants: *M* =1.20, *SE* = 0.72, White participants: *M* = 1.02, *SE* = 0.68), *F*(1, 95) = 0.03, *p* = .85, η_p^2 < .01, or for cognitive load condition (Low Load: *M* = 0.60, *SE* = 0.71, High Load: *M* = 1.63, *SE* = 0.69), *F*(1, 95) = 1.09, *p* = .30, η_p^2 = .01.

Furthermore, the analysis detected no significant two-way interactions (between racial group membership of participant and cognitive load condition, cognitive load condition and race of target individual, and racial group membership of participant and race of target individual), and no significant three-way interaction (between racial group membership of participant, cognitive load condition, and race of target individual), *Fs* < 3.03, *ps* > .09, η_p^2s < .03.

SCL. SCL change scores were derived by subtracting the mean SCL values during the neutral video clip viewing periods from the maximum SCL values during the emotional video clip viewing periods. These SCL data were then log transformed to correct for positive skewness.

Across the entire sample, SCL values increased significantly from the neutral video clips (Black target individual: $M = 3.99$, $SE = 0.26$; White target individual $M = 4.03$, $SE = 0.26$) to the emotional video clips (Black target individual: $M = 4.86$, $SE = 0.34$; White target individual $M = 4.87$, $SE = 0.34$). These differences were significant for both the Black target individual, $t(97) = -6.56$, $p < .001$, and the White target individual, $t(97) = -7.36$, $p < .001$.

The analysis detected a significant main effect for racial group membership of participant, $F(1, 94) = 20.47$, $p <. 001$, $\eta_p^2 = .18$. Specifically, Black participants had smaller SCL change scores than White participants (Black participants: $M = 0.35$, $SE = 0.16$; White participants: $M = 1.29$, $SE = 0.15$).

The analysis detected no significant main effect of target individual race (Black target individual: $M = 0.83$, $SE = 0.12$; White target individual $M = 0.81$, $SE = 0.11$), $F(1, 94) = 2.73$, $p = .10$, $\eta_p^2 = .03$, and of cognitive load condition (Low Load: $M = 0.80$, $SE = 0.16$, High Load: $M = 0.84$, $SE = 0.15$), $F(1, 94) = 0.31$, $p = .58$, $\eta_p^2 < .01$.

The analysis did, however, detect a significant two-way interaction between cognitive load condition and race of target individual, $F(1, 94) = 4.34$, $p = .04$, $\eta_p^2 = .04$. In the Low Load condition, participants had greater SCL increases in response to the Black target individual ($M = 0.90$, $SE = 0.18$) than in response to the White target individual ($M = 0.70$, $SE = 0.16$). In contrast, participants in the High Load condition had greater SCL increases in response to the

White target individual (*M* = 0.92, *SE* = 0.15) than in response to the Black target individual (*M* = 0.76, *SE* = .017).

There were no significant two-way interactions between racial group membership of participant and cognitive load condition, racial group membership of participant and race of target individual, and there was no significant three-way interaction between racial group membership of participant, cognitive load condition, and race of target individual, *Fs* < 2.14, *ps* > .15, η_p^2s = .02).

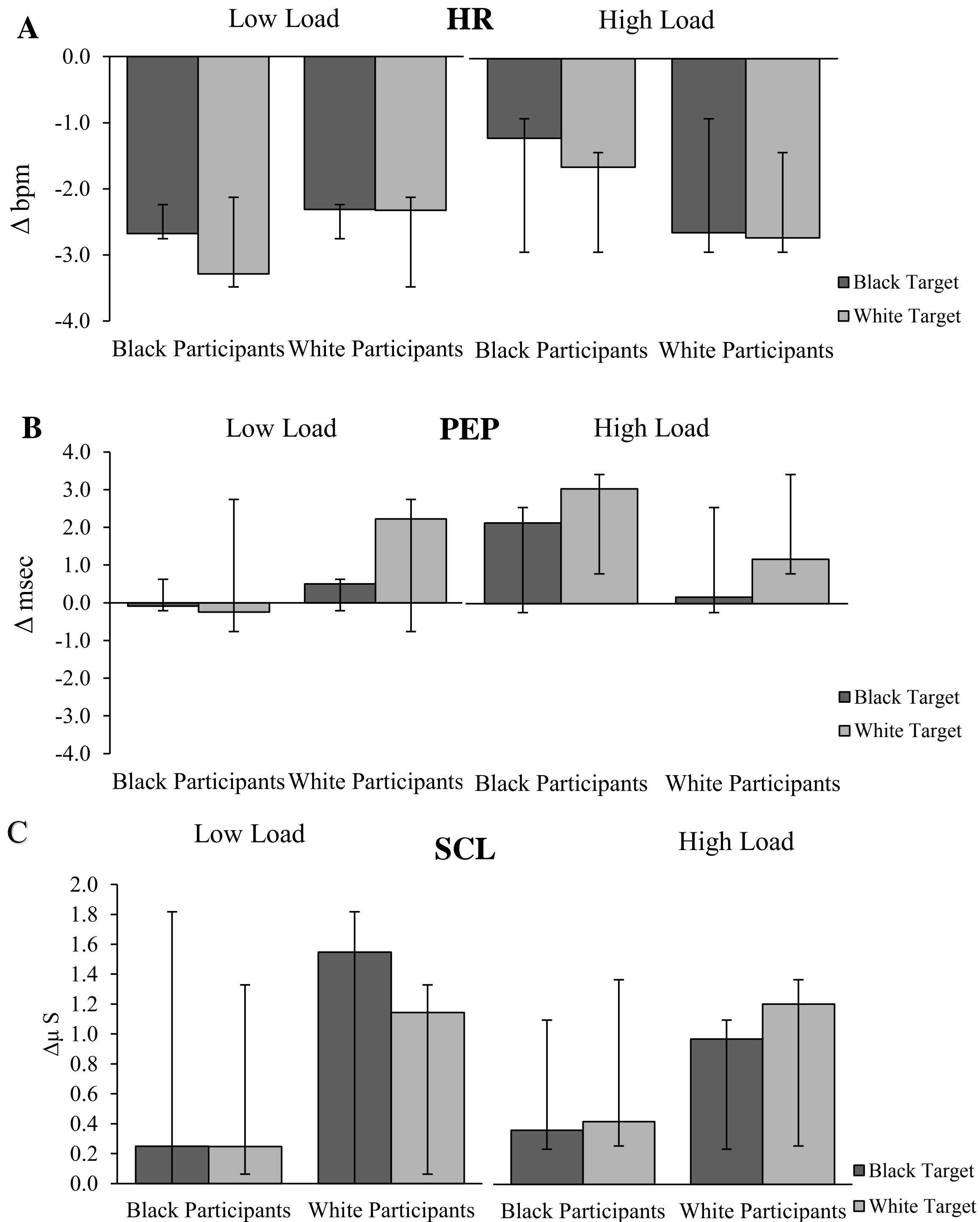

Figure 2. Physiological reactivity scores (from neutral to emotional clips) in response to Black and White target individuals, in the Low Load and High Load conditions. Panel A present heart rate (HR) data. Panel B presents pre-ejection period (PEP) data. Panel C presents skin conductance level (SCL) data. Error bars represent the standard error.

Frequency domain HRV analyses. To analyze HRV frequency data, the spectral data were log transformed in order to meet the assumption of normality. Six separate mixed-design ANOVAs examined the effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs. White) on LF, HF, and TF (sum of LF and HF) power for the neutral video clip viewing periods, and on LF, HF, and TF power for the emotional video clip viewing periods. Figure 3 shows the power spectral densities during emotional video clip viewing periods for both cognitive load conditions.

Neutral video clip viewing periods. Analyses of LF data revealed a significant main effect for racial group membership, White participants had significant greater LF power compared to Black participants (Black participants: $M = 2.54$, $SE = 0.06$; White participants: $M = 2.74$, $SE = 0.06$; $F(1, 95) = 6.42$, $p = .01$, $\eta_p^2 = .06$). There were no significant main effects for race of target individual ($F = 0.89$, $p = .35$, and η_p^2s = .01) or cognitive load condition ($F = 0.81$, $p = .37$, and η_p^2s = .01) and LF power.

The HF data analyses also revealed a significant main effect for racial group membership of participant. Black participants had significantly higher HF power than White participants (Black participants: $M = 2.97$, $SE = 0.07$; White participants: $M = 2.67$, $SE = 0.07$; $F(1, 95) = 8.88$, $p = .004$, $\eta_p^2 = .09$). There were no significant main effects for race of target individual ($F = 0.53$, $p = .47$, and η_p^2s = .01) or cognitive load condition ($F = 0.86$, $p = .36$, and η_p^2s = .01) and HF power.

There were no significant main effects for TF data (*Fs* < 1.28, *ps* > .26 and η_p^2s < .01) and no significant interaction effects for the LF, HF, or TF power data during the neutral clip viewing periods (*F* = 2.79 *ps* > .10 and η_p^2s < .03).

Emotional video clip viewing periods. Analyses of the LF power data revealed a significant main effect for race of target individual such that LF power in response to the emotional video clips was greater for the Black target individual (*M* = 2.72, *SE* = 0.04) than for the White target individual (*M* = 2.63, *SD* = 0.04), *F*(1, 95) = 9.10, *p* = .003, η_p^2 = .09.

There was also a significant main effect for racial group membership such that White participants (*M* = 2.76, *SE* = 0.05) had greater LF power in response to the emotional video clips than Black participants (*M* = 2.59, *SE* = 0.06), *F*(1, 95) = 5.30, *p* = .02, η_p^2 = .05.

There was no significant main effect for cognitive load condition and LF power in response to the emotional video clips, *F*(1,95) = 0.23, *p* = .64, η_p^2 < .01. Furthermore, there were no significant two-way or three-way interaction effects for LF power in response to the emotional video clips (*Fs* < 2.26, *ps* > .14, η_p^2s < .02).

Analyses of the HF power data revealed a significant main effect for racial group membership and HF power such that Black participants (*M* = 3.00, *SE* = 0.07) had greater HF power than White participants (*M* = 2.75, *SE* = 0.07) in response to the emotional video clips; *F*(1, 95) = 6.60, *p* = .01, η_p^2 = .07.

There were no significant main effects for race of target individual [*F*(1, 95) = 1.13*, p* = .30*,* η_p^2 *= .01*] or cognitive load condition [*F*(1, 95) = 1.14*, p* = .30*,* η_p^2 = .01] and HF data in response to the emotional video clips.

There was a significant two-way interaction between race of target individual and racial group membership of participant and HF power in response to the emotional video clips; $F(1, 95) = 4.66$, $p = .03$, $\eta_p^2 = .05$. Black participants had greater HF power towards the Black target individual ($M = 3.03$, $SE = 0.08$) than the White target individual ($M = 2.97$, $SE = 0.07$), whereas White participants had greater HF power towards the White target individual ($M = 2.76$, $SE = 0.07$) than the Black target individual ($M = 2.74$, $SE = 0.07$).

There were no significant two-way interactions between racial group membership of participant and cognitive load condition, cognitive load condition and race of target individual, and was no significant three-way interaction between racial group membership of participant, cognitive load condition, and race of target individual, and HF power in response to the emotional video clips ($Fs < 3.08$, $ps > .50$, $\eta_p^2 < .05$).

In terms of TF power, there was a significant main effect for race of target individual such that TF power was greater for the Black target individual ($M = 3.16$, $SE = 0.04$) than for the White target individual ($M = 3.11$, $SE = 0.04$); $F(1, 95) = 6.45$, $p = .01$, $\eta_p^2 = .06$.

There were no significant main effects for racial group membership [$F(1, 95) = 1.07$, $p = .30$, $\eta_p^2 = .01$] and cognitive load condition [$F(1, 95) = 1.08$, $p = .30$, $\eta_p^2 = .01$] and TF power.

Furthermore, there were no significant two-way or three-way interaction effects for TF power in response to the emotional video clips ($Fs < 3.08$, $ps > .08$, $\eta_p^2 < .03$).

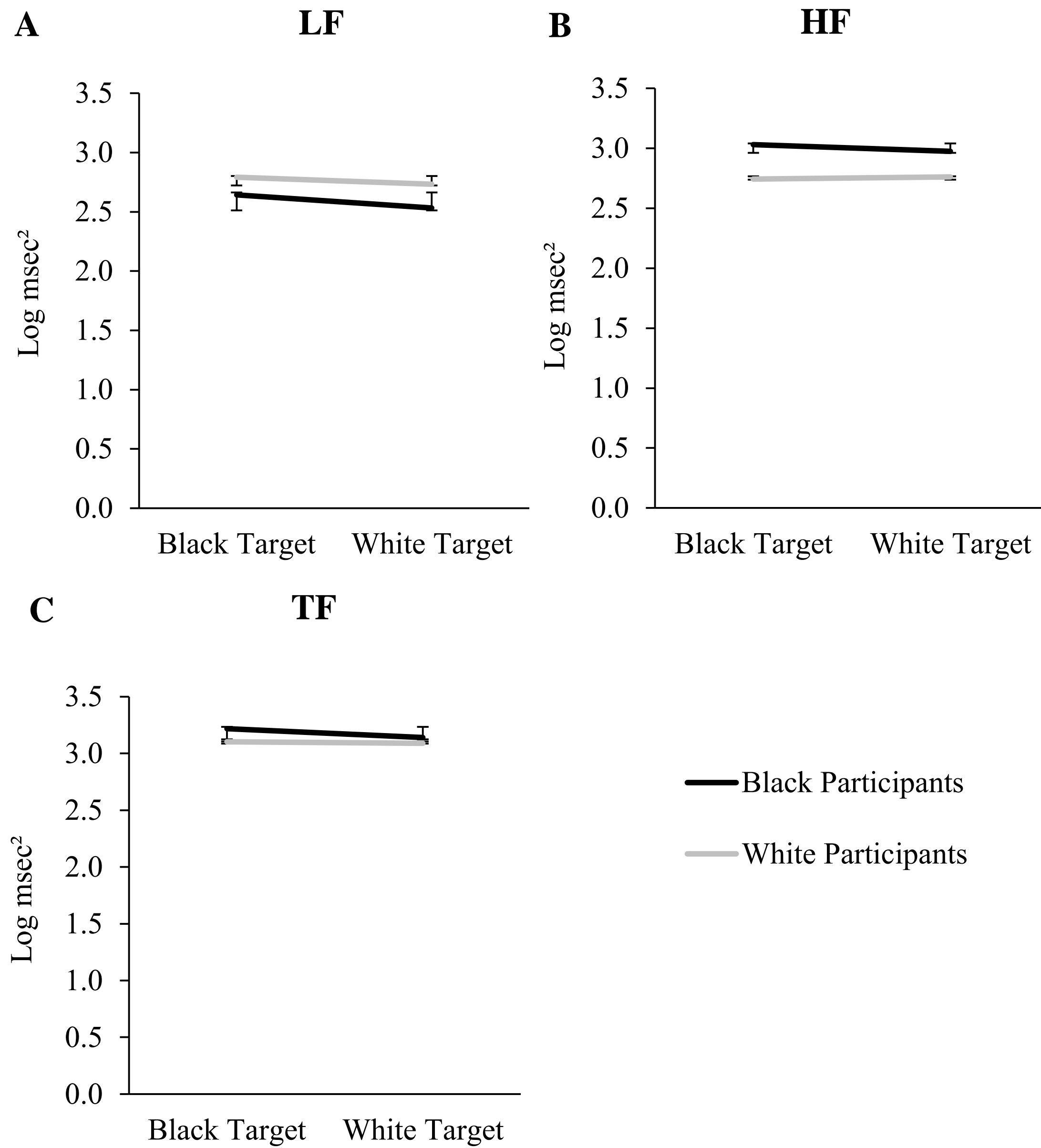

Figure 3. Power spectral densities during emotional video clip viewing periods for both cognitive load conditions. Panel A shows low frequency power (LF) data. Panel B shows high frequency power (HF) data. Panel C shows total frequency power (TF; sum of LF and HF) data. Error bars represent the standard deviation.

Testing Hypothesis Four

Hypothesis four stated that there will be less helping behavior under conditions of high cognitive load, and especially less helping directed towards the racial out-group member. Log linear analyses tested the association between racial group-membership, cognitive load, and the frequency of help offered, whilst a mixed-design ANOVA tested the influence of cognitive load condition, and racial group membership on the *z*-scores of the amount of help offered.

Data for one White participant in the High Load condition was excluded from these analyses because, during the debriefing, the participant noted that she doubted the authenticity of the helping behavior measure.

Frequency of helping behavior. Most participants (78%) who offered help, offered to help both the Black and the White target individual. I conducted analyses on whether the participants offered help or not (regardless of whether they offered to help the Black target individual only, the White target individual only, or both the Black and the White target individuals). This dichotomous scale was used because inferential statistical analyses on the frequency of helping directed towards either the Black or the White target individual was not possible due to lack of statistical power.

Log linear analyses detected no significant three-way interaction between racial group membership of participant, cognitive load condition, and helping behavior, $X^2(1) = 1.89$, $p = .17$. Although Black participants were more likely to offer help than White participants (Black participants: 61.5%; White participants: 43.1%), Pearson's chi-squared analyses detected no significant difference between racial group membership of participant and helping behavior, $X^2(1) = 3.50$, $p = .08$, Cramer's $V = -.18$.

Pearson's Chi-squared analysis detected a statistically significant difference between cognitive load condition and participants' self-reported willingness to help, however, $X^2(1) = 7.07$, $p = .01$, Cramer's $V = .26$. Closer inspection of this result revealed that participants in the Low Load condition were much more likely to report willingness to help (65.4%) compared to participants in the High Load condition (39.2%; see Figure 4).

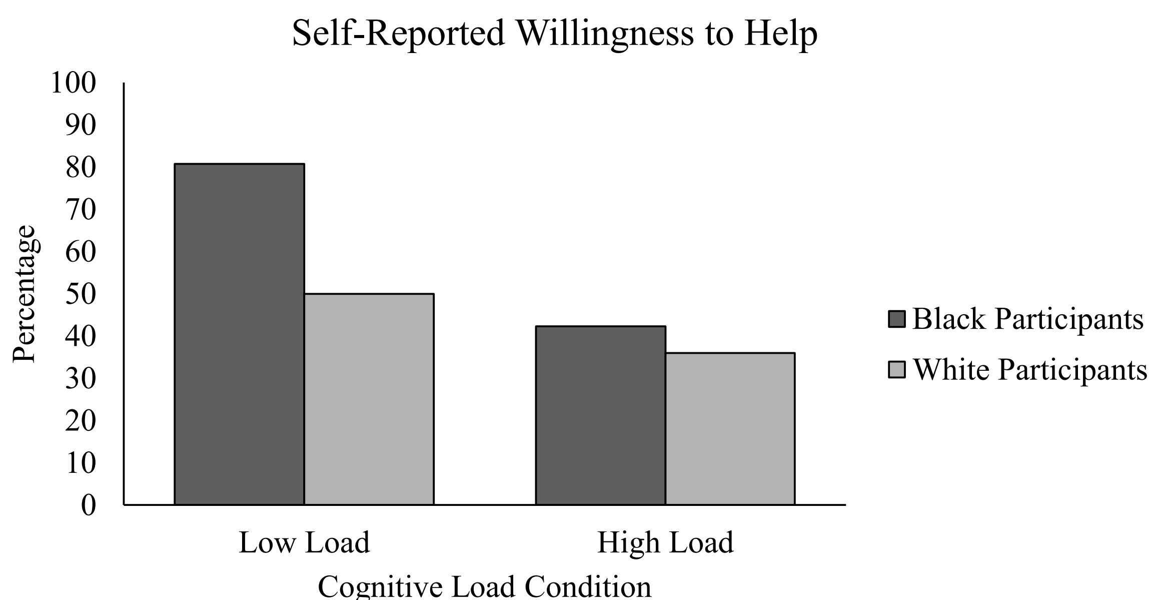

Figure 4. Self-reported willingness to help both the Black and the White target individual following the cognitive load manipulation.

Amount of help offered. Table 4 presents descriptive data regarding the amount of help Black and White participants offered to the individuals they saw in the emotional video clips. To analyze these data, the number of hours and the amount of money each participant offered were centered, converted into *z*-scores, and combined to ascertain the total amount of help each participant offered towards the Black and the White target individual. These data were positively skewed due to the large number of zero values in participants' responses and log transformations did not normalize the distribution. The following results should therefore be interpreted with caution.

Table 4
Number of Hours and Amount of Money Offered to Each Individual (N = 103)

			Cognitive load condition	
Group membership	Target race	Type of help offered	Low	High
Black participants	Black	Hours	2.65 (5.19)	1.58 (4.74)
		Money	6.15 (21.55)	12.31 (29.30)
	White	Hours	3.38 (5.74)	1.96 (7.05)
		Money	2.42 (9.91)	11.54 (29.35)
White participants	Black	Hours	0.42 (1.10)	0.44 (2.00)
		Money	16.54 (30.46)	7.40 (22.04)
	White	Hours	0.58 (1.17)	0.52 (2.02)
		Money	16.54 (30.46)	9.04 (23.15)

Note. Data presented are means, with standard deviations in parentheses. Possible range for hours = 0-50. Possible range for money (in ZAR) = 1-100.

A mixed-design ANOVA detected no significant main or interaction effects of racial group membership of participant (Black vs. White), cognitive load condition (Low vs. High), and race of target individual (Black vs White) on the *z*-scored amount of help offered to the Black and the White target individuals, *Fs* > 0.37, *p*s > .374, η_p^2s > .001).

Secondary Aims: Individual Differences and Empathic Responding and Helping Behavior

In addition, I aimed to assess the associations between various individual difference variables and empathic responding and helping behavior. I employed correlational analyses to investigate possible associations between scores on individual difference measures (MEIM, Intergroup Contact, IMS/EMS, QCAE) and (a) VAS scores for empathic responding, and (b) helping behavior. Two-tailed Spearman's Rank correlations were performed.

Ethnic identification. As Table 5 shows, there were no significant associations between strength of racial group identification (MEIM scores) and VAS ratings of empathic arousal, understanding, or concern, amongst Black participants and White participants in both the Low Load and High Load conditions.

Table 5 also shows that MEIM scores amongst Black participants were positively associated with *z*-scores of the amount of help offered towards the Black target individual in both the Low Load (p = .04) and the High Load (p = .01) condition. MEIM scores amongst White participants were not associated with helping towards the White target individual, however.

Table 5
Correlation Coefficients: MEIM Scores and Empathic Responding and Helping Behavior Toward the Racial In-group Target Individual (N = 104)

		Self-report measure			
Conditions / Participant Race	MEIM	Empathic Arousal	Empathic Understanding	Empathic Concern	Helping Behavior
Low Load					
Black participants	2.85 (0.37)	-.13	-.23	-.18	.40*
White participants	3.15 (0.41)	-.29	-.15	-.10	.13
High Load					
Black participants	2.78 (0.33)	.17	-.18	.04	.54**
White participants	2.79 (0.39)	.07	-.28	.05	-.08

Note. In the second column, means are presented with standard deviations in parentheses. MEIM = Multi-group Ethnic Identity Measure. MEIM scores range from 1 to 4, where scores of 1 indicate low ethnic identification and scores of 4 indicate high ethnic identification.
*p < .05. **p < .01.

Intergroup contact. As Table 6 shows, no self-reported empathy measures correlated significantly with scores on the measure of intergroup contact. There were also no significant associations between intergroup contact and the amount of help offered to the racial out-group target individual (Table 6).

Table 6

Correlation Coefficients: Intergroup Contact Scores and Empathic Responding and Helping Behavior Toward the Racial Out-group Target Individual (N = 104)

		Self-report measure			
Conditions / Participant Race	Intergroup contact	Empathic Arousal	Empathic Understanding	Empathic Concern	Helping Behavior
Low Load					
Black	3.72 (0.93)	-.28	<.01	-.04	-.10
White	4.75 (0.99)	-.02	-.14	.05	.02
High Load					
Black	3.86 (1.13)	.13	.03	.10	-.04
White	4.55 (0.85)	.32	.34	.21	-.24

Note. In the second column, means are presented with standard deviations in parentheses. Intergroup contact scores range from 1 indicating low levels of intergroup contact, to 7 indicating high levels of intergroup contact.

Motivations to respond without prejudice. As Table 7 shows, higher IMS scores amongst Black participants in the High Load condition were significantly associated with higher empathic arousal (p = .02), understanding (p = .004), and concern (p = .03) towards the White target individual (i.e., the racial out-group member). Furthermore, although nonsignificant at the 5% level, higher IMS scores amongst White participants in the High Load condition were associated with empathic arousal and understanding towards the Black target individual (i.e., the racial out-group member). The analyses detected no other statistically significant correlations.

Table 7

Correlation Coefficients: IMS/EMS Scores and Empathic Responding and Helping Behavior Toward the Racial Out-group Target Individual (N = 104)

Conditions / Participant race	IMS/EMS Score	Self-report measure			
		Empathic Arousal	Empathic Understanding	Empathic Concern	Helping Behavior
Low Load					
Black					
IMS	7.30 (1.65)	-.13	.18	-.03	-.11
EMS	3.49 (1.62)	.15	-.10	.20	.21
White					
IMS	8.04 (0.91)	-.06	-.27	-.23	-.30
EMS	4.57 (1.75)	-.17	-.25	-.34	-.11
High Load					
Black					
IMS	7.45 (1.40)	.45*	.55**	.44*	-.01
EMS	4.09 (1.75)	.23	.37	.04	-.28
White					
IMS	7.45 (1.64)	.34	.13	.02	-.10
EMS	4.85 (1.97)	-.30	-.34	-.09	-.18

Note. In the second column, means are presented with standard deviations in parentheses. IMS = Internal Motivation to Respond Without Prejudice Scale; EMS = External Motivation to Respond Without Prejudice Scale. IMS/EMS scores range from 1 to 9, where scores of 1 indicate low internal/external motivations to respond without prejudice and scores of 9 indicate high internal/external motivations to respond without prejudice.

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

Trait empathy. As Table 8 shows, high cognitive and total QCAE scores amongst Black participants in the High Load condition were associated with greater empathic arousal (cognitive QCAE, $p = .011$; total QCAE, $p = .025$) and empathic concern (cognitive QCAE, $p = .009$; total QCAE, $p = .012$) towards the White target individual (i.e., the racial out-group member). The analyses detected no other statistically significant correlations.

Table 8

Correlation Coefficients: QCAE Scores and Empathic Responding and Helping Behavior Toward the Racial Out-group Target Individual (N = 104)

		Self-report measure			
Conditions/ Participant Race/ QCAE Scale	QCAE	Empathic Arousal	Empathic Understanding	Empathic Concern	Helping Behavior
Low Load					
Black					
Affective	36.85 (1.57)	.01	-.02	.34	.08
Cognitive	60.27 (5.94)	.04	-.19	.23	.20
Total	97.12 (9.74)	.05	-.13	.36	.19
White					
Affective	36.04 (5.55)	.34	.02	.26	.15
Cognitive	58.12 (6.50)	-.01	.22	.29	.16
Total	94.15 (10.59)	.25	.14	.35	.24
High Load					
Black					
Affective	36.62 (5.67)	.04	-.04	.18	-.28
Cognitive	59.62 (8.65)	.50*	.25	.50**	.07
Total	96.23 (12.62)	.44*	-.25	.48*	-.03
White					
Affective	39.00 (4.19)	.06	.20	-.21	.25
Cognitive	60.96 (5.77)	-.18	-.34	-.06	.09
Total	99.96 (7.83)	-.04	-.29	-.14	.24

Note. In the second column, means are presented with standard deviations in parentheses. QCAE = Questionnaire of Cognitive and Affective Empathy. QCAE scores range from 1 to 4, where scores of 1 indicate low empathy and scores of 4 indicate high empathy.

*p < .05. **p < .01.

Discussion

The primary aim of this thesis was to investigate the influences of racial group membership and cognitive load on empathic responding and helping behavior. In particular, I wanted to assess whether individuals experience reduced empathy for, and are less willing to help, racial out-group compared to racial in-group members, when under conditions of high cognitive load. A secondary aim of this study was to explore associations between individual differences and empathic responding and helping behavior, under conditions of low or high cognitive load.

A sample of 104 women (52 Black and 52 White) participated. Each was assigned to either a low or a high cognitive load condition, with equal numbers of Black and White participants in each condition. Participants then watched video clips of Black and White target individuals experiencing distress. Outcome measures included participants' self-reported empathic responding and willingness to help each target individual, as well as their physiological responses while they watched each video clip. To help investigate the secondary aim described above, participants completed questionnaire measures that assessed ethnic identification, intergroup contact, motivations to respond without prejudice, and trait empathy.

Regarding the overall hypothesis regarding racial group membership (i.e., that there will be less empathic responding for racial out-group members than for racial in-group members in distress), I did not find the expected bias in terms of empathic responding toward racial in- versus out-group members. Rather, both self-reported (empathic arousal, understanding, and concern) and physiological [pre-ejection period (PEP), low frequency (LF), and total frequency (TF) power] responses were suggestive of greater empathic responding toward the Black target individual, for all participants. In terms of the effect of cognitive load condition, even though the manipulation appeared successful, the analyses detected no significant main effects of cognitive load condition on self-reported or physiological empathic responding.

Cognitive load condition did impact significantly on helping behavior, however. Participants in the High Load condition were significantly less willing to offer help than participants in the Low Load condition, although both Black and White participants tended to help both target individuals equally.

Finally, both racial group membership and the degree of cognitive load played a role in the associations between individual difference measures, empathic responding, and helping

behavior. Specifically, Black participants with higher levels of ethnic identification were more likely to state a willingness to help their in-group member (i.e., Black target individual), especially under conditions of high cognitive load. Furthermore, amongst Black participants, greater internal motivations to respond without prejudice, as well as greater trait empathy, were associated with greater empathic responding toward their racial out-group member (i.e., the White target individual), but only under conditions of high cognitive load.

In the remainder of the Discussion, I will discuss the significance of these findings in more detail, following the framework of the individual hypotheses as set out in the Introduction. Before addressing these findings in relation to previous research, I will briefly discuss the effectiveness of the emotion elicitation and cognitive load manipulation.

Efficacy of the Emotion Elicitation and Cognitive Load Manipulation

To lend credence to the interpretation of any significant findings, it was important to verify that the manipulations I implemented were successful. Regarding the empathy emotion manipulation, both self-report and physiological responses suggested that the video clips depicting individuals in distress (i.e., the emotional video clips) were successful in eliciting empathic responses from participants. Participants' ratings of the emotional video clips, in terms of empathic arousal, understanding, and concern, were significantly higher than those of the neutral video clips.

Analyses of physiological data indicated that participants had heart rate (HR) decreases and skin conductance level (SCL) increases from the neutral to the emotional video clip viewing periods. HR decreases in response to emotional stimuli may indicate an orienting response towards the stimulus (Avenanti et al., 2010; Bradley, Codispoti, Sabatinelli, & Lang, 2001).

Previous research has reported HR decreases in response to video clips of individuals experiencing sadness (Kreibig et al., 2007), as well as in response to images of individuals experiencing pain (Avenanti et al., 2010). Furthermore, SCL, an established measure of arousal, has been shown to increase when viewing videos of individuals in pain (Forgiarini et al., 2011). Hence, the currently observed pattern of physiological responses is consistent with participants' self-reports of their empathic responses and together they suggest strongly that the emotional video clips of the Black and the White individuals provoked more affective responses than did the neutral video clips. In short, the emotional video clips appeared effective in eliciting empathic responses from the participants.

Regarding the cognitive load manipulation, participants in the High Load condition, relative to those in the Low Load Condition, reported greater difficulty, effort required, level of attention required, level of fatigue, and motivation to continue with the rest of the experiment in their post-manipulation questionnaire. These results are consistent with previous findings within the ego depletion literature, and hence suggest that the task required of the High-Load participants may have involved greater executive control, and may have induced greater self-regulatory depletion, than the task required of the Low-Load participants (see, e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Webb & Sheeran, 2003).

In contrast to previous research, which suggests that diminished self-regulatory capacities lead to an increased desire to quit the task at hand, I found no significant difference in reported desire to quit across cognitive load conditions (Baumeister et al., 1998). Ego depletion theory posits that self-regulatory depletion (i.e., as engendered by the High Load task) will result in decreased motivation to engage in subsequent tasks that require self-regulation (Baumeister & Vohs, 2007). The current data failed to confirm that prediction, however: Participants in the Low

Load, rather than the High Load, condition reported decreased levels of motivation after completing the Stroop task. One possible explanation for this finding is that participants in the Low Load condition may have found the matched Stroop task tedious, and may have therefore felt less motivated to continue with the experiment than participants in the High Load condition (Hagger et al., 2010). On the other hand, participants in the High Load condition may have found the unmatched Stroop task more engaging because it was more difficult and less tedious, resulting in them feeling more motivated to continue with the experiment (Inzlicht & Schmeichel, 2012).

Regard the behavioral task (the DKEFS Design Fluency subtest), although analyses detected no statistically significant between-condition differences, participants in the High Load condition produced fewer novel designs than did those in the Low Load condition. This finding also fails to confirm a prediction derived from ego depletion theory. According to that theory, utilizing self-regulatory cognitive resources in one task (e.g., the incongruent Stroop task, as completed by High-Load participants) will result in fewer such resources being available when subsequent tasks are being completed (e.g., when participants completed the Design Fluency task, which required them to avoid breaking particular rules; Baumeister, Vohs, & Tice, 2007). Hence, although the present study's Design Fluency findings trend in the predicted direction, they provide no conclusive evidence that the High Load condition reduced participants' self-regulatory capacities.

A previous study on ego depletion that used a similar fluency task as a manipulation check found significant evidence of diminished self-regulatory capacities following exposure to a high-load cognitive condition (Schmeichel et al., 2006). Participants in that study completed three out of the five parts from the Ruff Figural Fluency test (RFF; i.e., where Part I contained 35

sets of a five-dot array, whilst Parts II and III contained 35 set sets of the five-dot array against a background of distractor items), whereas participants in the present study only completed the basic condition of the DKEFS Design Fluency test (i.e., containing 35 sets of a five-dot array similar to Part I of the RFF test). It is thus possible that the basic condition of the Design Fluency task on its own is not sensitive enough to detect evidence of diminished self-regulatory capacities. Self-regulatory depletion may be more apparent on the more difficult switching condition of the task. Another possibility is that diminished self-regulatory capacities may be more evident when several tasks are completed after the self-regulatory manipulation, rather than one task as done in the current study.

Effects of Racial Group Membership on Empathic Responding

Hypothesis One stated that, for all participants, there would be less empathic responding (as measured by self-reported empathic arousal, understanding, and concern, and by degree of physiological arousal) for racial out-group members than racial in-group members in distress. The observed data and subsequent analyses disconfirmed that hypothesis: Both Black and White participants self-reported greater empathic responding toward the Black target individual than the White target individual. Similarly, physiological responses, as measured by PEP, LF, and TF power, were suggestive of greater physiological arousal in response to the Black target individual than the White target individual. These results are inconsistent with previous research suggesting there is an in-group racial bias in empathic responding (Drwecki et al., 2011; Mathur et al., 2010; Xu et al., 2009).

Specifically, the HR response data in the current study are inconsistent with research on racial biases in HR responding (Forgiarini et al., 2011). For example, Avenanti et al. (2010)

found that participants had greater HR decreases in response to racial in-group compared to racial out-group members. These HR decreases were only apparent when the first 4 seconds of the stimulus presentation were analyzed, however, and not when participants' overall HR responses were analyzed. Because I used longer, more descriptive video clips to elicit empathy than Avenanti et al. did, it is difficult to determine *when* participants started to experience empathy while watching the video clips. Therefore, it was not possible to ascertain, as they did, whether participants' initial orienting responses resulted in greater HR decreases for the racial in-group compared to the racial out-group target individual.

In addition, analyses of the SCL data detected no interaction between racial group membership and race of the target individual. SCL responses of both Black and White participants increased from the neutral to the emotional video clips of both the Black and the White target individuals. These data stand in contrast to those presented by Forgiarini et al. (2011), who found dampened skin conductance (SC) responses for racial out-group members. It may be possible that a racial disparity in SC data is more likely when viewing racial in-group members in physical pain than in emotional distress, as video clips depicting physical pain may elicit a stronger arousal response than video clips depicting emotional distress (Simon, Craig, Gosselin, Belin, & Rainville, 2008). The currently observed increases in SCL responses may thus reflect a more general arousal response to the emotional stimuli, rather than a specific response that is influenced by the individuals' race (Critchley, 2002).

Physiological activation in response to the Black target individual. Both Black and White participant data indicated a stronger empathic response for the Black target individual than for the White target individual. Interestingly, participants' physiological responding also indicated heightened activity in response to the Black target individual. Specifically, PEP, LF,

and TF data showed similar patterns of reactivity across participant race: Both Black and White participants showed shorter PEP and greater LF and TF power responses towards the Black target in distress compared to the White target in distress. To aid in interpretation of this pattern of data, in the remainder of this Discussion I will define PEP as a measure of cardiac sympathetic activity (Sherwood et al., 1990); LF power as an index of baroreflex-mediated parasympathetic activity brought about by somatic SNS activation of vasomotor nerves (Rahman et al., 2011); and TF power as a measure of overall parasympathetic HRV, comprising both LF and HF power. Using those definitions, the current physiological results, taken together, suggest that the participants had heightened sympathetic and parasympathetic activity in response to the video clip of the Black target individual in distress compared to the White target individual in distress.

One explanation for the observed pattern of physiological responding is that participants experienced sympathetic and parasympathetic *co-activation*. Although the majority of research on physiological activity proposes that the SNS and the PNS act in a purely antagonistic manner (e.g., Appelhans & Luecken, 2006; Beauchaine, 2001), there is substantial evidence suggesting a more complex relationship between the systems (Norman et al., 2014). More specifically, SNS and PNS activity may occur on varying dimensions rather than on a single continuum, and so co-activation and co-inhibition between the two systems may be possible (Berntson et al., 1991; Cacioppo & Berntson, 1994; Norman et al., 2014; Paton, Boscan, Pickering, & Nalivaiko, 2005).

The SNS-PNS co-activation in the current study, characterized by HR decreases, SCL increases, parasympathetic increases (as seen in LF and HF responses), along with a degree of sympathetic drive (as seen in PEP responding), may be due to a *conservation-withdrawal* reaction that indicates a passive coping strategy (Engel & Schmale, 1972; Kreibig et al., 2007). This coping strategy involves withdrawal from the environment to promote energy conservation.

The strategy is usually self-protective in that it is designed to help individuals deal with stress (Bosch et al., 2001). In the current context, then, adopting such a strategy may have served to help participants cope with the emotional content of the video clip depicting the Black target individual in distress.

Although SNS-PNS co-activation occurs commonly during conditions of acute stress (Kingdom et al., 2000), or in response to material that is extremely gruesome (e.g., a recording of a surgical procedure; Bosch et al., 2001), previous studies do suggest that co-activation responses can occur in response to video clips of sadness (Kreibig et al., 2007). Hence, it is plausible that the responses observed here may have been elicited by the emotional content of the video clip of the Black target individual in distress.

There are, however, alternative explanations for the current pattern of physiological responses. One such explanation is that even though SNS-PNS co-activation was present when participants' average physiological responses were analyzed, such co-activation may not necessarily have been present within individual participants. The statistical tests I used involved group-based analyses of participants' average physiological reactivity scores. Thus, the occurrence of heightened sympathetic and parasympathetic activity amongst the participants' averaged physiological responses does not necessarily indicate that SNS-PNS co-activation occurred in individual participants. It is certainly possible that not all participants simultaneously displayed shortened PEP responses and heightened LF and TF power in response to the video clip of the Black target individual in distress: Some participants might have had greater SNS responses, whereas others might have had greater PNS responses.

In order to establish whether SNS-PNS co-activation occurred, the reactivity scores would have to be standardized before analysis of participants' individual physiological

responses. Although some previously published studies e.g., Kreibig et al. (2007) standardized reactivity scores on different physiological measures, I did not take that step in the current study. Hence, the current PEP scores and frequency power scores are not directly comparable, and therefore it is difficult to establish the degree of SNS activity relative to the degree of PNS activity in response to the video clip of the Black target individual in distress. In other words, although the current findings suggest that participants experienced both SNS and PNS activity, it is not possible to establish whether both systems were activated to equal degrees with the analytic methods used in this study. In the current study, physiological activity was analyzed to help understand the affective arousal component of the empathic response amongst participant groups, rather than among individual participants per say. Thus, further statistical analyses that are beyond the objective of this thesis are required to establish whether participants in the current study showed simultaneous SNS-PNS co-activation.

Although the PEP, LF, and TF data in this study confirms the presence of SNS-PNS co-activation during the experience of heightened empathy, the HF power data does not fit with the trend of heightened activity toward to the video clip of the Black target individual, but rather is contrary to these findings. Specifically, the HF ANOVA results suggest an interaction between racial group membership and race of the target individual in terms of participants' HF power responses: Participants showed heightened HF power responses towards the same-race target individual. A closer inspection of this result indicates that Black participants displayed a greater HF power response to the Black than the White target individual, whereas White participants' HF power responses to each target individual were of a similar magnitude. The observed interaction effect related to HF power data therefore likely occurred as a result of the HF activity amongst Black participants, rather than changes in HF power amongst both participant groups.

Another factor to account for when interpreting the HF power data is respiration. Because respiration rate plays a significant role in HF power (Grossman, Karemaker, & Wieling, 1991), the presence of baseline differences in Black and White participants' power frequency responses suggests that the groups may have different baseline respiration rates. A measure of respiration rate is therefore required to accurately interpret findings regarding HF power, and establish the role HF activity during the experience of empathy (Montano et al., 2009).

The role of physiological arousal in empathic responding. Regardless of the mechanisms underlying participants' physiological responses, the data suggest that participants' physiological reactivity facilitated an empathic response toward the Black target individual in distress. Sympathetic activation during the empathic experience provoked by viewing the Black target individual in distress may have been part of an emotional arousal response that draws attention to the individual's distress (Jones & Gagnon, 2007).

Furthermore, parasympathetic activity, is proposed to regulate the empathic response (Jones & Gagnon, 2007), and is known to facilitate social communication and prosocial behavior (Porges, 2003). Hence, in the current study, participants' parasympathetic responses while viewing the video clip of the Black target individual in distress may accompany greater compassion and empathic concern towards that particular individual (Stellar, Cohen, Oveis, & Keltner, 2015). Given that participants' HR also decreased while viewing the Black target individual in distress, parasympathetic activity may serve to control the heightened arousal (brought about by the shorted PEP activity) in response to the emotional content of that video clip, allowing for feelings of empathy rather than personal distress (Decety, 2011).

Influence of social desirability on empathic responding. A possible interpretation for why both Black and White participants showed greater empathic responding for the Black target

individual, is that social desirability contributed to participants' empathic responses. In the current study, Black participants reported equally high ratings of empathic understanding for the Black and the White target individual in distress, whereas White participants reported much more empathic understanding for the Black than the White target individual in distress. This pattern of data lends support to the notion that self-report responses (particularly amongst the White participants) may have been influenced by social desirability.

Social desirability often plays a role in individuals' tendency to report experiencing empathy (Keysers & Gazzola, 2014), particularly in the context of race relations, where there is strong societal pressure for people to appear non-prejudiced towards racial out-group members (Butz & Plant, 2009). Hence, participants in the current sample may have reported high ratings of empathic understanding for the racial out-group member in order to appear non-prejudiced.

The observed increased empathic responding toward the Black target individual in distress (especially amongst White participants) may also have been exacerbated by their awareness of the historical injustices that resulted in that individual's experience of pain (Mathur, Richeson, Paice, Muzyka, & Chiao, 2014). The history of racial discrimination during apartheid means racial inequality remains prominent in South Africa. White South Africans remain economically and socially privileged in comparison to Black South Africans (Leibbrandt, Finn, & Woolard, 2012; Seekings, 2008). Given the social context of the video clips, participants may have felt more empathy and compassion for the individual who was most disadvantaged (i.e., the Black target individual in distress).

White participants' empathic responses may additionally, stem from increased compassion for the Black target individual due to feelings of collective guilt (i.e., "White guilt"; Klandermans, Werner, & Van Doorn, 2008). Specifically, White participants may feel guilt

when confronting their numerous social and economic advantages, and position of privilege in relation to the Black target individual (Iyer, Leach, & Crosby, 2003). Research on the experience of collective guilt in a post-apartheid context suggests that feelings of guilt regarding the injustices and inequality during the apartheid era are apparent amongst some White South Africans. In addition, research indicates that individuals who identify with liberal ideology are particularly likely to experience guilt for having benefited (both socially and economically) from apartheid policies (Klandermans et al., 2008). Thus, although feelings of guilt may have played a role in the current findings, guilt may be more apparent amongst those participants who see themselves as liberal.

In summary, the current data are partially inconsistent with previous research on the racial in-group bias in empathic responding. They suggest that participants, both Black and White, experienced more empathy in response to the video clip of a Black target individual in distress. These findings provide some support for recent studies indicating that the racial bias in empathic responding is not inevitable, and can be influenced by factors related to social desirability (Chiao & Mathur, 2010; Contreras-Huerta et al., 2013; Mathur et al., 2014). Furthermore, the physiological data reported here highlight the complexity of physiological response patterns to emotional stimuli (Berntson & Cacioppo, 2007), as well as the need for further research on physiological responses to empathy-eliciting scenarios.

Effects of Cognitive Load on Empathic Responding

Hypothesis Two stated that there will be less empathic responding under conditions of high cognitive load than under conditions of low cognitive load. Relatedly, Hypothesis Three stated that reduced empathic responding under conditions of high cognitive load will be more evident toward racial out-group than racial in-group members. Analyses of self-report and

physiological data disconfirmed both of these hypotheses. There were no significant between-condition differences in self-reported empathic responding, nor was there an interaction between racial group membership, cognitive load condition, and empathic responding. However, physiological responding, specifically participants' SCL reactivity toward the video clip of the Black target individual in distress (i.e., the video clip that elicited a greater empathic response from participants) varied across cognitive load conditions.

Cognitive load and self-reported empathic responding. Although completing the high-load task increased participants' ratings of task difficulty, level of attention required, level of fatigue, and motivation to continue with the rest of the experiment, participants in the Low Load and High Load conditions had similar ratings of self-reported empathic arousal, understanding, and concern after viewing the emotional video clips. These results are inconsistent with previous research suggesting that increasing cognitive load reduces empathic responding (Rameson et al., 2012). One possible reason why I did not find the cognitive load effects observed by Rameson et al. (2012) is that the present study employed a different design to that one. Specifically, whereas participants in that study completed the cognitive load task *while* they watched the video clips, participants in the present study completed the cognitive load task *before* they watched the video clips. Participants in Rameson et al. (2012), may have reported less empathy when under cognitive load because of they did not pay attention to the empathic stimuli rather than because of limits to their self-regulatory capacities.

Furthermore, Rameson et al. (2012) used a within-subjects design, where all participants were instructed to watch the video clips naturally in the first condition and completed the cognitive load condition last. Although completing the task in this order helped capture participants' spontaneous response to the video clip (without the influence of the other task

instructions), participants in that study may thus have reported less empathy in the cognitive load condition because they were fatigued rather than because of the cognitive load manipulation.

Cognitive load and physiological responding. Analyses of the SCL data detected a significant interaction between cognitive load condition and race of the target individual in the video clips. Specifically, participants in the Low Load condition showed greater SCL increases while watching the clip of the Black target individual than while watching that of the White target individual, whereas participants in the High Load condition showed greater SCL increases while watching the clip of the White target individual than while watching that of the Black target individual. These SCL data suggest that participants' heightened physiological arousal in response to the video clip that ordinarily elicited more empathy (i.e., that of the Black target individual) was influenced by having a lower cognitive load.

These findings are inconsistent with previous research suggesting no influence of self-regulatory depletion on participants' skin conductance activity. Specifically, Schmeichel et al. (2006) induced self-regulatory depletion by asking some participants to exaggerate their responses while they watched a film clip that elicited feelings of disgust. They found similar SCL responses between depletion and control conditions. These findings might be argued to be specific to stimuli that elicit disgust, rather than applying to self-regulatory depletion in general. Findings of the current study provide tentative confirmatory evidence that heightened cognitive load results in dampened somatic arousal during the experience of empathy. Further research is required to clarify whether this effect of dampened somatic arousal reflects the experience of empathy more generally, or rather happens in response to particular aspects of the video clip of the Black target individual used in this study.

Effects of Racial Group Membership and Cognitive Load on Helping Behavior

Hypothesis Four stated that there will be less helping under conditions of high cognitive load (and especially less helping directed towards racial out-group members) than under conditions of low cognitive load. The observed data and subsequent analyses partially confirmed this hypothesis: Cognitive load, but not target individual race, affected the likelihood of helping behavior.

This finding of a decreased willingness to help under conditions of high cognitive load is consistent with that of De Wall et al. (2008). Interpreted within the framework of ego depletion theory (Muraven, Tice, & Baumeister, 1998), the helping option offered to participants may have invoked a motivational conflict: They had to use their cognitive resources to decide whether to offer help or not. Consequently, participants in the High Load condition may have been less able to engage their cognitive resources when presented with the helping option, and hence will have been less inclined than participants in the Low Load condition to offer help (Baumeister et al., 1998; DeWall et al., 2008). Overall, then, the results of the present study support the idea that high cognitive load conditions may influence the likelihood of individuals manifesting helping behavior.

The helping behavior data also indicated, however, that participants were just as likely to offer help to racial in- and out-group target individuals, and that they offered equal amounts of help to each target individual. I predicted conditions of high cognitive load would influence helping behavior towards racial out-group members, based on the findings by DeWall et al. (2011). The present findings, however, are in line with those presented in the meta-analysis conducted by Saucier et al. (2005) that concluded that there is no firm evidence of a racial in-group bias in participants' willingness to help. According to Saucier et al. (2005), one possible

explanation for the observed findings is that participants in the study were unable to justify helping the racial in-group member over the racial out-group member. According to the justification-suppression model, individuals strive to appear non-prejudiced and egalitarian in their behavior toward out-group members (Crandall & Eshleman, 2003). As a result, individuals only favor in-group members over out-group members when they are able to justify their behavior without appearing prejudiced. High conditions of cognitive load may therefore, not impact the justification process involved in the decision to offer help. On the other hand, because participants in this study were presented with a low emergency helping scenario, they might have found it difficult to justify helping racial in-group members over racial out-group members.

It is also possible that exposure to the TRC video clips made participants more likely to want to appear unbiased. The content of the TRC video clips may have created an explicit awareness of the racial group membership of each target individual, and of the personal and societal effects of racial discrimination (Mathur et al., 2014). Hence, participants may have been particularly motivated to help the Black and the White target individuals equally.

Although data from this study, along with those from DeWall et al. (2008), provide evidence that self-regulatory depletion influences subsequent helping behavior, further research is required to establish the mechanism by which a high cognitive load task, such as the Stroop task used in the current study, influences participants' decision to help. Recent research suggests that the original reports of the effect sizes for the depletion effect induced by the Stroop task (e.g., Hagger et al., 2010) may have been overestimated (Carter & McCullough, 2014). Furthermore, a separate line of recent research suggests there is little evidence supporting the notion that self-regulatory capacities rely on a limited resource that can be depleted (Inzlicht, Schmeichel, & Macrae, 2014). For example, studies on the depletion effect do not measure

resource depletion directly, but rather assume depletion based on participants' performance in tasks subsequent to the initial self-regulatory task (Hagger et al., 2010). In addition, further research (e.g., Carter & McCullough, 2013; Molden et al., 2012) has failed to replicate the findings that provided initial evidence for resource depletion (i.e., that resource depletion results in lower blood glucose levels; DeWall et al., 2008; Gailliot et al., 2007).

Following that line of reasoning, Inzlicht and colleagues (2015) offer an alternative interpretation of the present findings. They argue that successfully completing a self-regulatory task, such as the Stroop, relies on the value an individual places on completing the task successfully, rather than on a set of limited self-regulatory resources. The value an individual places on any particular task is subjective, of course, and depends on several dynamic factors (e.g., the reward available for completing the task, or personal interest in succeeding on the task). Thus, even though individuals may initially value their performance on self-regulatory tasks, the value they place on task performance may decrease as the task proceeds (e.g., they may no longer value the reward, or may no longer feel motivated to continue when they are confronted with signs of failure on the task). When participants appear to have diminished self-regulatory capacities on subsequent self-regulatory tasks, this may simply be a consequence of them having experienced a shift in priorities away from the original task, and then paying less attention to their performance on subsequent self-regulatory tasks (Inzlicht, Berkman, & Elkins-Brown, 2015; Inzlicht & Schmeichel, 2012).

Placing this framework on the current data suggests the interpretation that participants in the High Load condition may have had a greater reduction in the subjective value they placed on the self-regulatory Stroop task than did participants in the Low Load condition. High Load participants were therefore less likely to offer help at the end of the experiment, when they were

least motivated to make the decision to help. Even under this framework, it remains possible that participants still experienced empathy while watching the video clips because they engaged with the emotional content of the video clips, and thus did not experience a reduced subjective task value while watching those clips.

In addition, the helping behavior data revealed that participants generally made relatively small contributions when presented with the helping behavior questionnaire: They offered an average of ZAR10.31 (25.40) or 1.45 (4.29) hours. It is possible that if participants had been required to endure more costs (e.g., had been forced to make a choice about committing to volunteer for a whole semester), participants in the High Load condition would have experienced a further priority shift, resulting in them offering to help the racial in-group target individual over the racial out-group target individual (Dovidio, Piliavin, Gaertner, Schroeder, & Clark, 1991; Saucier et al., 2005).

Individual Differences, Empathic Responding, and Helping Behavior

In the following section, I will discuss the influence of participant scores on the self-report individual difference measures (i.e., measures of ethnic identification, intergroup contact, motivations to respond without prejudice, and trait empathy) on empathic responding and helping behavior across the Low Load and High Load conditions.

Ethnic identification. MEIM scores amongst Black participants were significantly positively associated with increased helping behavior toward the racial in-group target individual in the Low Load condition, and even more strongly in the High Load condition.

Stronger identification with one’s racial group is thought to result in a greater

tendency to perceive other racial in-group members as similar to oneself, making individuals more willing to help racial in-group members (Cialdini et al., 1997; Mathur et al., 2010; Roberts et al., 1999). Neuroimaging research shows that individuals who identify strongly with their racial group show increased activity in cortical midline structures [e.g., MPFC, ACC, and posterior cingulate cortex (PCC)] when exposed to racial in-group compared to racial out-group members in painful situations (Mathur et al., 2012). One interpretation of these data is that, because cortical midline structures are typically associated with self-reflective and affective processing, individuals with high MEIM scores process racial in-group members' pain in a self-referential way (Mathur et al., 2012). The association observed in the current study between ethnic identification and the amount of help offered may therefore be explained by increased self-referential processing.

In the current study, the relationship between strength of ethnic identification and degree of racial in-group helping behavior was observed only in Black participants, and the amount of help offered amongst White participants was not associated with the strength of their identification with their ethnic group. These findings suggest that the amount of helping offered to racial in-group members amongst White participants was unrelated to their ethnic identity. It is possible that White participants may have not related to the White target individual as a fellow in-group member, and thus the amount of help they offered may have been more related to their feelings of concern for the individual's pain and suffering, rather than from an act of helping a fellow in-group member.

Intergroup contact. An extensive social psychological literature suggests that intergroup contact can facilitate perspective-taking, which may engender a greater understanding of a racial out-group member's experience (see, e.g., Pettigrew & Tropp, 2008). Thus, in an experimental

scenario such as that of the current study, individuals with a history of more contact with other racial groups might be expected to show increased empathy towards racial out-group members (Cao et al., 2015). The current data analyses detected no significant associations between intergroup contact scores and empathic responding, however.

Of note here is that data from the current sample suggest relatively high amounts of cross-racial contact, especially amongst White participants, consistent with other recent research at UCT (Schrieff, Tredoux, Finchilescu, & Dixon, 2010). The high amounts of cross-racial contact in the sample may explain the lack of racial bias in participants' empathic responding.

It is possible, however, that participants' responses on the inter-group contact measure were subject to social desirability effects, resulting in scores higher than the actual amount of inter-group contact amongst the sample (Dhont, Van Hiel, De Bolle, & Roets, 2012). Similarly, although participants may be exposed to racial out-group members during the ordinary university day (e.g., in lectures, in residence dining halls), very little of this contact may actually include meaningful interactions with people of other races. Stronger correlations between contact with racial out-group members and empathy for racial out-group members may be present when intergroup contact is measured in terms of participants' actual ratings of meaningful interactions and close friendships with racial in-group members (Beeney, Franklin, Levy, & Adams, 2011; Swart et al., 2011).

Recent research on the influence of intergroup contact on empathic responding suggests a slightly different relationship between the type of intergroup contact and empathy for racial out-group members (Cao et al., 2015). Investigations by Cao and colleagues (2015) found that contact with racial out-group members that stems from incidental interactions (e.g., seeing racial out-group members at university) may in fact have a stronger influence on reducing racially

biased empathic responding than contact with racial out-group members that stems from close relationships with racial out-group members. The authors, however, do note that the low percentage of meaningful intergroup contact amongst participants in their sample may have influenced their results on the associations between meaningful intergroup contact and racially biased empathic responding (Cao et al., 2015).

Overall, given that participants in the sample are in frequent contact with racial out-group members, they may be less likely to show an in-group bias in empathic responding than individuals who are not in frequent contact with racial out-group members. Future research, however, should seek to further understand the role of meaningful contact with racial out-group members on racial biases in empathic responding.

Motivations to respond without prejudice. The current data analyses detected significant associations between internal motivations to respond without prejudice and empathic arousal, understanding, and concern, but only amongst Black participants in the High Load condition. Although nonsignificant, White participant data did show positive associations between empathic arousal and understanding and internal motivations to respond without prejudice, in the High Load condition.

Previous research suggests that individuals with a high internal motivation to respond without prejudice tend to internalize their motivation to appear egalitarian, and thus will provide an unbiased response regardless of whether they are under conditions of high cognitive load or not (Ito et al., 2015). The current findings, however, are inconsistent with previous literature and suggest that internal motivations to respond without prejudice only impact empathic responding when under conditions of high cognitive load. This interpretation is tentative, however, as there were no correlations between IMS scores and empathic concern amongst the High Load group.

Moreover, the correlations between IMS scores and empathic arousal and understanding amongst White participants in the High Load condition failed to reach significance at the 5% level. Thus, further investigation with a larger sample size is required to gain a better understanding of these findings.

An alternative account for the findings is that the association between internal motivations to respond without prejudice and empathic responding was not apparent amongst participants in the Low Load condition, because of other factors that contributed to these participants' data, rather than the Low Load condition per say. For example, it may be that participants in the Low Load conditions lower levels of fatigue (as seen in the self-report manipulation check measure) than participants in the High Load condition, they may have resulted in them responding empathically regardless of their motivations to respond without prejudice.

Trait empathy. In the High Load condition, higher trait empathy scores amongst the Black but not the White participants were positively associated with empathic concern toward the racial out-group target individual. These results are partly consistent with previous research suggesting that individuals higher in trait empathy experience greater empathic responding than individuals lower in trait empathy, especially under conditions of cognitive load (Rameson et al., 2012). It is also possible that participants' ratings of their trait empathy were subject to social desirability effects, resulting in most participants rating themselves as highly empathic. In addition, participant self-report empathic responding also indicated very high empathic ratings, resulting in little variability in both trait empathy and empathy in response to the video clips. The analyses thus, may have been unable to detect significant associations between trait empathy and self-reported empathic responses because of the lack of variability in the data (Goodwin &

Leech, 2006). The correlation amongst Black participants in the High Load condition likely reflected the fact that the variability was greatest amongst this group of participants compared to the other participant groups.

Interestingly, these data indicate that participants' self-reported empathic responses were associated with their cognitive but not affective trait empathy scores. These findings suggest that empathic responding for racial out-group members is modulated by individuals' abilities to engage in perspective-taking rather than their affect sharing abilities. Further research should explore these associations however, as these findings were only evident amongst Black participants in the High Load condition.

Limitations

One limitation of the current study is that it only included female participants. I opted to use a female-only sample because substantial empirical evidence suggests that there are sex differences in empathic responding (see, e.g., Eisenberg & Miller, 1987; Michalska, Kinzler, & Decety, 2013; Rueckert & Naybar, 2008). For instance, women are typically more sensitive to others' emotions, and experience greater empathic concern (Hoffman, 1977). Women also are more perceptive to pain to males (Mathur et al., 2014). Also, research shows that women are better at recognizing and inferring mental states compared to men (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The present study's results may therefore not be generalizable to men, and further research should be conducted to gain a better understanding of the influence that, for instance, race-by-sex interactions may have on empathic responding.

A second limitation involves the helping measure employed in this study. This measure gave participants the option of helping either the Black, or the White, or both individuals.

Participants were therefore not forced to favor one target individual over the other. Most, therefore, chose to split their donation/ hours volunteered between the two target individuals. If, however, the measure had been structured in a forced-choice format, it is possible that participants may have favored helping racial in-group members more than racial out-group members.

Furthermore, the helping behavior scenario involved a low-emergency helping opportunity (e.g., Kunstman & Plant, 2008). Had participants been presented with a high-emergency helping opportunity, where they were forced to offer help to one individual immediately, one might have gained a better understanding of the influence of racial group membership on helping behavior under conditions of high cognitive load. Future research on helping behavior may benefit from employing a between-groups design where participants encounter an emergency scenario (e.g., where an individual is in need of urgent medical assistance such as demonstrated in Kunstman & Plant, 2008) with either a racial in- or racial out-group member in distress.

A third limitation concerns the statistical analyses conducted on participants' physiological data. I conducted analyses on group mean responses in order to address each specific hypothesis regarding the influence of racial group membership and cognitive load on empathic responding. A deeper understanding might be gained, however, if more detailed analyses to address the physiological response patterns to each video clip were conducted on an intra-individual basis. Such analyses might, for example, help detect the presence of sympathetic-parasympathetic co-activation within an individual's empathic response, and might help assess the relationship between self-reported empathy and physiological responding.

A fourth limitation concerns the study design and the possible lack of ecological validity of the observed results. Although participants watched real-life video clips and were led to believe that the helping measure was authentic, participants' responses (both self-report and physiological) may lack ecological validity. That is to say, although a controlled environment is typically necessary to investigate and record physiological responses, participants' empathic responding may be very different in a real-life situation. It is possible that, in real-life conditions of high cognitive load where the environment is less controlled and predictable, individuals may experience far less empathy as they may be less likely to provide socially desirable responses. Similarly, the cognitive load manipulation participants completed in this study may not be comparable to the effects of stress and diminished self-regulation people encounter in their daily lives. Cognitive load in a real-life context is far more complex and affects more than participants' self-regulatory abilities. It also, for example, affects emotional state and level of fatigue (DeWall, Baumeister, Stillman, & Gailliot, 2007; Evans, Boggero, & Segerstrom, 2015). Hence, the present study's results may not capture adequately how limits to self-regulatory capacities may impact humans' ability to respond empathically and to offer help to racial out-group members in everyday scenarios.

A fifth possible limitation of the current findings (other than the interpretations presented in the Discussion) is that the video clips of the individuals in distress differed in perceived emotional intensity, or in the empathic reactions they generated. A recently published study employing the same video clips also found, in a sample of White female participants, significantly greater empathic understanding and empathic concern towards the Black woman in distress (Meiring, Subramoney, Thomas, Decety, & Fourie, 2014). It is thus possible that the video clips used in this study were not matched exactly in terms of the empathic reactions they

could generate, which may have resulted in greater emotional responding towards the Black target individual.

A final limitation involves the design fluency behavioral manipulation check. Because it involved a high degree of self-regulation and pressure on participants, it may have had an influence on participants' physiological responding and self-regulatory capacities, making it difficult to distinguish between those in the high and low cognitive load conditions. Participants in both conditions completed the design fluency task immediately after they completed the Stroop manipulation. The task has many rules and has to be completed under time pressure, and so participants may have found it somewhat stressful. The possible stress induced by this measure may have had an influence on participants' physiological responses, making it difficult to differentiate the effects of the high versus low cognitive load task. Moreover, the design fluency task also requires self-regulation (Schmeichel et al., 2006), and may therefore have impacted on the cognitive capacities of participant in the Low Load condition. Although a second self-regulatory task is essential to assess the effectiveness of the cognitive load manipulation, the fact that the manipulation check was a self-regulatory task itself may have made it challenging to accurately assess the influence of the Stroop manipulation on participants' physiological activity and subsequent self-regulatory capacities.

Conclusion

The current study is the first to investigate the individual, and potentially interacting, effects of racial group membership and cognitive load on empathy and helping behavior by means of both self-report and physiological responding. I found no influence of racial group membership on empathy or helping behavior, although empathy was greater for the Black target individual than for the White target individual. These findings contribute to a growing literature suggesting that the racial bias in empathy and helping behavior is not inevitable and may be influenced by factors other than the race of the individual in distress.

The observed data also suggest that the physiological activity underlying empathic responding may involve the complex interaction between sympathetic and parasympathetic nervous system activity. Given the complexity of the observed patterns of physiological activity, future research should investigate whether the physiological bases of empathic responding results from sympathetic parasympathetic co-activation, or from individually different sympathetic-dominant or parasympathetic-dominant activity.

Another key contribution of the study is that the data demonstrate that cognitively demanding situations may influence willingness to help without necessarily influencing empathic responding. Identifying mechanisms that might explain how cognitive load reduces helping behavior may help uncover why cognitive load influenced helping behavior but not empathic responding in the current sample.

Finally, the study found trends suggesting that individual differences in ethnic identification and motivations to respond without prejudice may influence the relationship between racial group membership, empathic responding, and helping behavior. It is important for

future studies to consider the influence of such individual differences on empathic responding toward racial out-group members.

Overall, the current study highlights that the complex physiology underlying empathy may co-vary with subjective empathic feelings and serve to facilitate an individual's empathic response. Furthermore, the study's findings emphasize that although racial group membership may play a role in empathic responding, race is just one of many factors that might influence an individual's physiological and subjective empathic response when encountering an out-group member in distress.

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Appendix A:

Sociodemographic information

Participant ID		Time		Date	DD/MM/YYYY
Electrode Measure	cm				

Age

Gender: Male / Female

Population Group

Black	White
Coloured	Indian
Other (please specify):	

Nationality

South African
Other (please specify):

Did you grow up in South Africa? Y / N

First Language

Second Language

Are you fluent in English? Y / N

How many years have you spent in tertiary* education? ____ years

Health Questionnaire

Have you ever been diagnosed with any psychiatric or mental health disorder (e.g. Depression)? Y / N

If Yes:

a) Specify the diagnosis:

b) Are you currently on any treatment? Y / N

Have you ever been diagnosed with any cardiovascular or respiratory disorder? Y / N

If Yes:

a) Specify the diagnosis:

b) Are you currently on any treatment? Y / N

Have you ever had an injury involving impact to your head (e.g. a motor vehicle accident or fall)? Y / N

If Yes:

When did the injury occur?

Did you lose consciousness from the injury? Y / N

Period of loss of consciousness:

Tertiary education= Post-Matric Education (Number of years in university)

Study Criteria Questionnaire

Are you currently on any medication? | Y | N |
If so, please state the medication name ____________________
____

Have you consumed any caffeinated beverages (e.g., tea, coffee, coco-cola, energy drinks) within the last 6 hours? | Y | N |

If Yes:
State the beverage(s) ____________________
Quantity consumed ____________________

Have you consumed any alcoholic beverages within the last 6 hours? | Y | N |

Last time you consumed caffeine ____________________

Have you done any exercise/strenuous physical activity in the last 6 hours? | Y | N |

Last time you exercised ____________________

Are you a smoker? | Y | N |

If yes, when last did you smoke? ____________________

Appendix B:
Video Selection Pilot Study

The study aimed to match two emotion eliciting video clips and two neutral video clips to include in the main study "The Effects of Racial Group Membership and Cognitive Load on Empathy and Helping Behavior." The two emotion video clips and two neutral video clips were matched on ratings of sadness (empathic concern). Video clips were also matched on content to ensure that the video clips were similar on as many factors (e.g., themes, approximate age of the target individual) as possible (other than the race of the target individual).

Methods

Participants

A sample of forty undergraduate females (*M* = 21.97 years, *SD* = 2.82) of mixed racial identities (16 Black, 16 White, 8 Other) were recruited through the Department of Psychology's Student Research Participation Program (SRPP) to participate in the pilot study.

Materials

Video stimuli. Firstly, five emotion (empathy) eliciting video clips were selected from the Truth and Reconciliation Commission (TRC) hearings in South Africa. Two video clips (White C and White D) depicted a White target individual in distress. In both video clips the White individual discusses the loss of her daughter, due to apartheid violence. Three video clips (Black E, Black F, and Black G) depicted black target individuals in distress. Video clip Black E depicted a woman discussing the loss of her husband due to apartheid violence. Black F and Black G depicted a woman discussing her experience of rape and torture while detained by apartheid police officials. Secondly, two video clips that did not evoke an emotional response were selected to serve as neutral controls that would provide a comparison to the emotion video clips. Video clips were selected from a video-recorded interview with faculty members at the

University of Cape Town (UCT) medical school. One neutral clip (White A) depicted a White female professor and the other clip (White B) a Black female doctor, both speaking about the UCT curriculum for medical students. Each video clip was 2-min in length, and was displayed on a 21-inch computer monitor through E-Prime v2.0 (Psychology Software Tools, Inc., Pittsburgh, USA).

Self-reported empathic responding. Ratings were obtained for each empathic component process on an empathy scale booklet, that is, (a) how much subjective arousal the participant felt (empathic arousal), (b) how much distress the target individuals appeared to be experiencing (empathic understanding), and (c) how sad participants felt for the target individuals (empathic concern). Higher ratings thus indicated more empathic arousal, understanding, or concern, respectively.

Procedure

The study was conducted in a laboratory in the Department of Psychology at the University of Cape Town (UCT). Upon arrival, we informed participants of the study's aim to select video clips for further research. After signing an informed consent document, participants filled out a demographics form. We then instructed participants to watch the video clips and rate their responses on the appropriate page of the empathy scale booklet. The seven video clips were played in a randomized order.

Data Analyses

Dependent samples *t*-tests sought to match video clips according to nonsignificant differences regarding their mean scores for ratings of how sad participants felt for the individual in each clip (empathic concern). The White and the Black video clips selected were matched on how sad participants felt for the target individual (empathic concern).

Table B1

Mean Self-Reported Empathic Concern for Neutral and Emotional Video Clips (N = 40)

		Target individual race		*t*-Test comparisons		
Video Clip	Clip contrasts	White	Black	*t*	*p*	*r*
Neutral	White A vs. White B	1.49 (1.30)	1.14 (0.65)	1.56	.13	.28
Emotional	White C vs. Black E	7.92 (1.39)	8.24 (1.06)	-1.62	.11	.29
	White C vs. Black F	7.92 (1.39)	8.04 (1.34)	-0.59	.56	.11
	White C vs. Black G	7.92 (1.39)	8.45 (0.93)	-2.57	.01*	.43
	White D vs. Black E	7.11 (1.68)	8.24 (1.06)	-4.02	<.001***	.60
	White D vs. Black F	7.11 (1.68)	8.04 (1.34)	-3.23	.003**	.51
	White D vs. Black G	7.11 (1.68)	8.45 (0.93)	-6.90	<.001***	.79

Note. In the third and fourth columns, means are presented with standard deviations in parentheses. Degrees of freedom were (1, 39) for each between-group comparison.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Results and Conclusion

Dependent sample *t*-tests between the two neutral clips indicated no significant difference in self-reported empathic concern, between the two neutral clips (see Table B1). The emotional video clip contrasts White C versus Black E and White C versus Black F showed no significant differences in self-reported empathic concern.

Regarding the content of the video clips, White C and Black E depicted women of similar ages, both discussing their experience of loss during apartheid, thus the clips matched well on content. Black F on the other hand, depicted a theme of rape and personal torture.

Based on these findings, we selected video clip White C and video clip Black E for the purposes of the main study as the clips elicited similar ratings of empathic concern amongst participants and were of similar content.

Appendix C:

Cognitive Load Manipulation Pilot Study

The study aimed to establish the effectiveness of the Stroop task in inducing conditions of high cognitive load. Participants completed either a Low Load or a High Load version the Stroop task, followed by self-report and behavioral manipulation check items. According to depletion theory (Baumeister et al., 1998; Gailliot, Plant, Butz, & Baumeister, 2007), engaging in a self-regulatory task utilizes one's cognitive resources, resulting in a poor performance on subsequent tasks that utilize self-regulatory capacities. I therefore hypothesized that participants in the High Load condition would have higher self-reported ratings of resource depletion, as well as a poorer performance on behavioral measures of resource depletion.

Methods

Participants

A sample of 32 undergraduate females (*M* = 20.19 years, *SD* = 2.62) of mixed racial identities (8 Black, 23 White, 1 Other) were recruited through the Department of Psychology's Student Research Participation Program (SRPP) to participate in the pilot study. Participants were randomly allocated into either a Low Load or High Load condition upon arriving at the study.

Materials

Cognitive load task. Cognitive load was manipulated by administering a version of the Stroop task, adapted previously by Shelton et al. (2011), via E-Prime version 2.0. Participants in the Low Load condition completed a version of the task where all trials were matched (i.e., the word was printed in the same font color), where participants in the High Load condition completed a version of the task where only 20% of trials were matched (i.e., 80% of words were printed in incongruent font colors). Both tasks ran for a total of 7-min. Participants total error

rate (i.e., total number of incorrect responses) and mean reaction time (i.e., average time to respond after being presented with each stimulus) were captured via E-Prime.

Self-report manipulation check. Participants completed a 7-item self-report manipulation check after completing the cognitive load task. Participants rated the Stroop task on a 7-point Likert type scale (Appendix D). The task was rated according to: (i) difficulty, (ii) effort required, (iii) desire to quit, (iv) obligation to continue, (v) level of attention required, (vi) level of fatigue, and (vii) level of motivation to continue with the rest of the experiment.

Behavioral manipulation checks. Participants completed three behavioral manipulation check items: the basic condition of the Delis-Kaplan Executive Functioning Scale (DKEFS; Delis, Kaplan, & Kramer, 2001) Design Fluency task; page one of the Card Rotations Test (Ekstrom, French, & Harman, 1976); and an unsolvable anagram task adapted from Muraven, Tice, and Baumeister (1998). The first two manipulation tasks (i.e., the design fluency and card rotations task) were counterbalanced and participants were allocated 1-min to complete each task. The outcome measures were the number of novel designs created on the Design Fluency task and the number of correct items on the card rotations test.

For the unsolvable anagram task, participants were given a page with the letters “O, N, E, C, I”. Participants were instructed to unscramble the letters to solve the anagram as quickly as they can. They were also instructed to alert the researcher when they solved the anagram, or no longer wish to continue with the anagram. Since the task had no solution, the outcome measure was participants’ persistent time (i.e., the time it took for them to decide to quit solving the task).

Results

Self-Report Manipulation Check

Participants in the High Load condition reported higher levels of task difficulty, effort required, desire to quit, obligation to continue, attention required, and fatigue than participants who completed the Low Load Stroop task. Only responses for task difficulty and effort required reached statistical significance, however (See Table C1).

Table C1
Ratings of the Low Load and High Load Task on 7-item Likert-type Questionnaire (N = 32)

	Median Ratings Across Cognitive Load Condition		Mann-Whitney *U* comparisons		
Self-Report Item	Low	High	*U*	*P*	*r*
Difficulty	2.00	3.00	54.00	<.001***	-.52
Effort required	3.00	5.00	63.00	<.001***	-.44
Desire to quit	2.00	2.50	93.00	.09	-.24
Obligation to continue	3.00	4.00	89.50	.07	-.26
Level of attention	5.00	6.00	89.00	.07	-.27
Fatigue	2.50	3.00	110.50	.26	-.12
Level of motivation	6.00	6.00	127.50	.50	<.01

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

Behavioral Manipulation Checks

Participants in the Low Load condition ($M = 8.69$, $SD = 3.86$) completed a greater number of designs on the DKEF's design fluency task than participants in the High Load condition ($M = 7.83$, $SD = 2.99$). This difference was not significant, however ($p = .20$).

Participants in the Low Load condition ($M = 47.06$, $SD = 13.63$) also completed slightly more designs on the Card Rotations tasks than participants in the High Load condition ($M = 46.44$, $SD = 14.91$). This difference was also not significant, ($p = .45$).

Finally, participants in the Low Load condition ($M = 402.69$, $SD = 157.43$) persisted on the unsolvable anagram task for a longer (measured in seconds) than participants in the High Load condition ($M = 358.31$, $SD = 159.28$). This difference was not significant ($p = .22$).

Error Rate and Reaction Time

Independent sample *t*-tests revealed that participants in the High Load condition (*M* = 12.06, *SD* = 9.15) made more errors than participants in the Low Load condition (*M* = 6.31, *SD* = 4.29), *p* = .02. Furthermore, participants in the High Load condition (*M* = 799.48, *SD* = 283.46) had a slower average reaction time (msec) than participants in the Low Load condition (*M* = 683.25, *SD* = 100.40), *p* = .05.

Conclusion

Results from the pilot study suggest that the High Load Stroop task is greater in difficulty and effort required compared to the Low Load Stroop task. Participants in the High Load condition also made more errors and took longer to respond on the Stroop task than participants in the Low Load condition. These findings are consistent with previous literature on self-regulatory depletion (e.g., Baumeister et al., 1998).

Although trends in the behavioral results suggest limited self-regulatory capacities (i.e., poorer performance on the Design Fluency and Card Rotation tasks, and longer persistent time on the unsolvable anagram task) amongst the High Load condition, these results did not reach statistical significance. It is, however, possible that the limited sample size of the pilot study (*N* = 32) made it difficult to detect differences on these behavioral measures.

In conclusion, the trends in the pilot study provide some evidence that the High Load Stroop task utilizes a greater amount of self-regulation compared to the Low Load Stroop task.

Appendix D:

Self-Report Rating Scale

Please complete to the following items on the scale below:

How difficult did you find the colour naming task?

1	2	3	4	5	6	7
Very Easy						Very Difficult

How much effort did it take to perform the colour naming task?

1	2	3	4	5	6	7
Very Little Effort						A Lot of Effort

How strong a desire did you feel to stop working on the colour naming task?

1	2	3	4	5	6	7
Not Very Strong						Very Strong

How much were you forcing yourself to work on the colour naming task?

1	2	3	4	5	6	7
Not At All						A Great Deal

How much attention did you feel the task required?

1	2	3	4	5	6	7
Little Attention						Lot of Attention

How tired do you feel after completing the colour naming task?

1	2	3	4	5	6	7
Not Very Tired						Very Tired

How much effort do you plan to put into the rest of the experiment?

1	2	3	4	5	6	7
Not Much Effort						A Lot of Effort

Appendix E:

Helping Behavior Measure

UNIVERSITY OF CAPE TOWN

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The University of Cape Town is regularly approached by organisations and individuals in need of assistance in various areas of development. As part of our ***Social Responsibility Initiative*** we aim to connect these organisations and individuals with potential resources in order to promote growth and development in South Africa.

CHARITABLE DONATION REQUEST

The individuals from the last 2 video clips are active members of **RECON-SA,** an organisation that promotes restoration in South Africa by means of co-operation and communication.

RECON-SA have recently experienced massive cut-backs from funders, and are struggling to stay afloat. The organization therefore appeals to the UCT community for *any* form of assistance, be it financial or by means of volunteerism.

If you would like to support any of RECON-SA's causes, please state the amount of money or number of hours you wish to contribute.

Ginn Fourie, inspired by her daughter, became actively involved in the organisation and runs regular workshops for RECON-SA. Her involvement in RECON-SA makes it possible for her to reach out to others who also suffered great loss due to Apartheid violence.

- ☐ I wish to volunteer _____________ hours to Ginn's Fourie's workshops.
- ☐ I wish to donate ____________ to Ginn Fourie's workshops

Nomonde Calata, widow of Fort Calata, runs a branch of the organisation that involves co-ordinating restoration projects for RECON-SA. Her projects help those in similar situations to overcome their sorrow and grief.

- ☐ I wish to volunteer _____________ hours to Nomande Calata's projects.
- ☐ I wish to donate ____________ to Nomande Calata's projects.

*****Note: Donating 2 hours a week, for 3 months will total 24 hours***

Contact Details

Name: ____

Student number: ____

Email address: ____

Contact number: ____

Appendix F:
Multi-group Ethnic Identity Measure

In this country, people come from many different countries and cultures, and there are many different words to describe the different backgrounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Black, White, Coloured, Indian, and many others. These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be ____________________

Circle the numbers below to indicate how much you agree or disagree with each statement.

1. I have spent time trying to find out more about my ethnic group, such as its history, traditi and customs.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

2. I am active in organizations or social groups that include mostly members of my own ethn group.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

3. I have a clear sense of my ethnic background and what it means for me.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

4. I think a lot about how my life will be affected by my ethnic group membership.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

5. I am happy that I am a member of the group I belong to.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

6. I have a strong sense of belonging to my own ethnic group.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

7. I understand pretty well what my ethnic group membership means to me.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

8. In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

9. I have a lot of pride in my ethnic group.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

10. I participate in cultural practices of my own group, such as special food, music, or customs.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

11. I feel a strong attachment towards my own ethnic group.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

12. I feel good about my cultural or ethnic background.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

13- My ethnicity is

- ☐ 1. Black
- ☐ 2. White
- ☐ 3. Colored
- ☐ 4. Indian
- ☐ 5. Mixed; Parents are from two different groups
- ☐ 6. Other (write in): ______________________________________

14- My father's ethnicity is (use numbers above) ___

15- My mother's ethnicity is (use numbers above) ___

Appendix G:

Intergroup Contact Measure

Please answer the following questions about your interactions with White people.

1. How often do you talk with people who are White at university?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

2. How often do you meet White people in your everyday life at university?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

3. How often do you talk with people who are White in your hometown?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

4. How often do you meet White people in your everyday life in your hometown?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

5. Are your interactions with White people generally...

1	2	3	4	5	6	7
Cooperative						Competitive

6. Are your interactions with White people generally...

1	2	3	4	5	6	7
Superficial						Intimate

7. About how many of your friends are White?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

8. How often do you spend time with friends who are White?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

9. About how many of your closest Black friends have friends who are White?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

10. About how many people in your immediate family have friends who are White?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

Contact Questionnaire

Please answer the following questions about your interactions with Black people.

1. How often do you talk with people who are Black at university?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

2. How often do you meet Black people in your everyday life at university?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

3. How often do you talk with people who are Black in your hometown?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

4. How often do you meet Black people in your everyday life in your hometown?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

5. Are your interactions with Black people generally...

1	2	3	4	5	6	7
Cooperative						Competitive

6. Are your interactions with Black people generally...

1	2	3	4	5	6	7
Superficial						Intimate

7. About how many of your friends are Black?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

8. How often do you spend time with friends who are Black?

1	2	3	4	5	6	7
Never	Rarely	Sometimes	Quite a Bit	Often	Very Often	All the time

9. About how many of your closest White friends have friends who are Black?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

10. About how many people in your immediate family have friends who are Black?

1	2	3	4	5	6	7
None	A Few	Less Than Half	Half	More than Half	Most	All

Appendix H:

IMS/EMS

The following questions concern various reasons or motivations people might have for trying to respond in nonprejudiced ways toward White people. Some of the reasons reflect internal/personal motivations whereas others reflect more external/social motivations. Of course, people may be motivated for both internal and external reasons; we want to emphasize that neither type of motivation is by definition better than the other. In addition, we want to be clear that we are not evaluating you or your individual responses. All your responses will be completely confidential. We are simply trying to get an idea of the types of motivations that students in general have for responding in nonprejudiced ways. If we are to learn anything useful, it is important that you respond to each of the questions openly and honestly. Please give your response according to the scale below

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

____ 1. Because of today's PC (politically correct) standards I try to appear nonprejudiced toward White people.

____ 2. I attempt to act in nonprejudiced ways toward White people because it is personally important to me.

____ 3. I try to hide any negative thoughts about White people in order to avoid negative reactions from others.

____ 4. If I acted prejudiced toward White people, I would be concerned that others would be angry with me.

____ 5. According to my personal values, using stereotypes about White people is OK.

____ 6. I am personally motivated by my beliefs to be nonprejudiced toward White people.

____ 7. I attempt to appear nonprejudiced toward White people in order to avoid disapproval from others.

____ 8. Because of my personal values, I believe that using stereotypes about White people is wrong.

____ 9. I try to act nonprejudiced toward White people because of pressure from others.

____ 10. Being nonprejudiced toward White people is important to my self-concept.

IMS/EMS

The following questions concern various reasons or motivations people might have for trying to respond in nonprejudiced ways toward Black people. Some of the reasons reflect internal/personal motivations whereas others reflect more external/social motivations. Of course, people may be motivated for both internal and external reasons; we want to emphasize that neither type of motivation is by definition better than the other. In addition, we want to be clear that we are not evaluating you or your individual responses. All your responses will be completely confidential. We are simply trying to get an idea of the types of motivations that students in general have for responding in nonprejudiced ways. If we are to learn anything useful, it is important that you respond to each of the questions openly and honestly. Please give your response according to the scale below

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

____ 1. Because of today's PC (politically correct) standards I try to appear nonprejudiced toward Black people.

____ 2. I attempt to act in nonprejudiced ways toward Black people because it is personally important to me.

____ 3. I try to hide any negative thoughts about Black people in order to avoid negative reactions from others.

____ 4. If I acted prejudiced toward Black people, I would be concerned that others would be angry with me.

____ 5. According to my personal values, using stereotypes about Black people is OK.

____ 6. I am personally motivated by my beliefs to be nonprejudiced toward Black people.

____ 7. I attempt to appear nonprejudiced toward Black people in order to avoid disapproval from others.

____ 8. Because of my personal values, I believe that using stereotypes about Black people is wrong.

____ 9. I try to act nonprejudiced toward Black people because of pressure from others.

____ 10. Being nonprejudiced toward Black people is important to my self-concept.

Appendix I:

QCAE

People differ in the way they feel in different situations. Below you are presented with a number of characteristics that may or may not apply to you. Read each characteristic and indicate how much you agree or disagree with the item by ticking the appropriate box. Answer quickly and honestly.		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	I sometimes find it difficult to see things from the 'other guy's' point of view.				
2.	I am usually objective when I watch a film or play, and I don't often get completely caught up in it.				
3.	I try to look at everybody's side of a disagreement before I make a decision.				
4.	I sometimes try to understand my friends better by imagining how things look from their perspective.				
5.	When I am upset at someone, I usually try to 'put myself in his shoes' for a while.				
6.	Before criticising somebody, I try to imagine how I would feel if I was in their place.				
7.	I often get emotionally involved with my friends' problems.				
8.	I am inclined to get nervous when others around me seem to be nervous.				
9.	People I am with have a strong influence on my mood.				
10.	It affects me very much when one of my friends seems upset.				
11.	I often get deeply involved with the feelings of a character in a film, play or novel.				
12.	I get very upset when I see someone cry.				
13.	I am happy when I am with a cheerful group and sad when the others are glum.				
14.	It worries me when others are worrying and panicky.				
15.	I can easily tell if someone else wants to enter a conversation.				
16	I can pick up quickly if someone says one thing but means another.				
17.	It is hard for me to see why some things upset people so much.				
18.	I find it easy to put myself in somebody else's shoes.				
19.	I am good at predicting how someone will feel.				
20.	I am quick to spot when someone in a group is feeling awkward or uncomfortable.				
21.	Other people tell me I am good at understanding how they are feeling and what they are thinking.				
22.	I can easily tell if someone else is interested or bored with what I am saying.				
23.	Friends talk to me about their problems as they say that I am very understanding.				
24.	I can sense if I am intruding, even if the other person does not tell me.				
25.	I can easily work out what another person might want to talk about.				

		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
26.	I can tell if someone is masking their true emotion.				
27.	I am good at predicting what someone will do.				
28.	I can usually appreciate the other person's viewpoint, even if I do not agree with it.				
29.	I usually stay emotionally detached when watching a film.				
30.	I always try to consider the other fellow's feelings before I do something.				
31.	Before I do something I try to consider how my friends will react to it.				

Appendix J:

Informed Consent Document

Informed Consent to Participate in Research and Authorization for Collection, Use, and Disclosure of Response Data and Other Personal Data

You are being asked to take part in a research study. This form provides you with information about the study and seeks your authorization for the collection, use and disclosure of your response data, as well as other information necessary for the study. The Principal Investigator (the person in charge of this research) or a representative of the Principal Investigator will also describe this study to you and answer all of your questions. Your participation is entirely voluntary. Before you decide whether or not to take part, read the information below and ask questions about anything you do not understand. By participating in this study you will not be penalized or lose any benefits to which you would otherwise be entitled.

1. Name of Participant ("Study Subject")

____

2. Title of Research Study

Physiological Responses to Cognitive Processing and Person Processing

3. Principal Investigators

Kevin G. F. Thomas, Ph.D.
Senior Lecturer
Department of Psychology
University of Cape Town

Melike Fourie, Ph.D.
Department of Psychology
University of Cape Town

4. What is the purpose of this research study?

The purpose of this research is to collect information about the different physiological responses people have to person processing.

5. What will be done if you take part in this research study?

Your physiological responses will be recorded while you perform a cognitive task and while you view a number of video clips. Responses will be obtained by attaching electrodes to your skin. The video clips will last only two minutes each and you will be asked to rate your responses to the content of these clips. Some of the clips may evoke an emotional response whereas others are more neutral. Please rate the clips according to your *own* experience of them. You will also complete a series of questionnaires assessing personality traits and

behavioral styles. After the session is over, you will be informed in detail about the design of the study and the research questions that we hope to answer.

6. **If you choose to participate in this study, how long will you be expected to participate in the research?**

   The experiment consists of one session, which should not last longer than 90 minutes.
   If at any time during the experiment you find any of the procedures uncomfortable, you are free to discontinue your participation without penalty.

7. **How many people are expected to participate in the research?**

   100

8. **What are the possible discomforts and risks?**

   There are no known risks associated with participation in this study. However, if you do feel distressed after the study, we will talk with you and give a referral for care if necessary.

9. **What are the possible benefits to you?**

   You may or may not personally benefit from participating in this study.

10. **What are the possible benefits to others?**

    The findings from this study will add to the scientific knowledge base of how humans process emotions under different conditions.

11. **If you choose to take part in this research study, will it cost you anything?**

    Participating in this study will not cost you anything.

12. **Will you receive compensation for taking part in this research study?**

    You will receive no compensation for taking part in this study, aside from three SRPP credits.

13. **Once personal and performance information is collected, how will it be kept secret (confidential) in order to protect your privacy?**

    Information collected will be stored in locked filing cabinets or in computers with security passwords. Only certain people have the right to review these research records. These people include the researchers for this study and certain University of Cape Town officials. Your research records will not be released without your permission unless required by law or a court order.

14. **What information about you may be collected, used and shared with others?**

The information gathered from you will be demographic information, cognitive task performance scores, a questionnaire on your ratings of the cognitive task, your ratings of the video clips, your responses on the questionnaires, and physiological responses. The data will assist further research; however your personal details will not be shared with others.

15. Signatures

As a representative of this study, I have explained to the participant the purpose, the procedures, the possible benefits, and the risks of this research study; and how the participant's performance and other data will be collected, used, and shared with others:

____ __________________
Signature of Person Obtaining Consent and Authorization Date

You have been informed about this study's purpose, procedures, possible benefits, and risks; and how your performance and other data will be collected, used and shared with others. You have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

You voluntarily agree to participate in this study. You hereby authorize the collection, use and sharing of your performance and other data. By signing this form, you are not waiving any of your legal rights.

____ __________________
Signature of Person Consenting and Authorizing Date