Cognitive Depletion Effects on Empathy and Helping for Racial Out-Group Members

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Abstract

Empathy is a complex construct that appears to be driven by automatic (bottom-up) affective responses as well as (top-down) dynamic appraisal processes. Recent research aims to understand how group identification affects our ability to empathize with others. One particularly interesting line of research suggests that attenuated empathic responses toward out-group members might be associated with depleted cognitive resources (as seen, for example, under stressful situations where one is more likely to respond with empathy toward close friends than strangers). It remains unclear, however, how bottom-up and top-down processes interact to produce empathic concern and helping toward in-group versus out-group members. To investigate this interaction, we studied the empathic responses of a sample of white females assigned to either a Cognitive-Depletion or a Control condition (n = 15 each). After being exposed to the experimental manipulation (requiring them to apply a complex set of rules in a letter detection task) or an equivalent control condition, participants viewed video clips depicting racial in-group and out-group members in emotional distress. We examined participants' cardiovascular physiological responses, self-reported empathic arousal, understanding, and concern as well as their prosocial behaviour in response to those video clips. Our data suggest that cognitive depletion resulted in reduced sympathetic responses, as well as decreased helping behaviour toward both in-group and out-group members. In terms of out-group biases, empathic responding and helping of out-group members were not greatly affected, which may be related to a high internal motivation to respond without prejudice in this particular sample.

Keywords: empathy, helping, cognitive depletion, physiological, out-group, race

Cognitive Depletion Effects on Empathy and Helping for Racial Out-Group Members

South Africans who experienced apartheid first-hand have vivid recollections of the atrocities committed in the name of racial segregation. Although younger generations were not exposed to the levels of discrimination that existed during the apartheid era, racial discrimination is not left fully in South Africa's past. Tangible remnants of Black versus White racism remain (Rossouw, 2008), and xenophobic violence towards Black foreigners is a prevalent threat (McVeigh, 2011). It is perplexing to consider that, under certain circumstances, humans can be effortlessly altruistic, but then can, under other circumstances, participate in the violation of fellow human beings, or even fail to intervene when witnessing these destructive behaviours. Research into intergroup empathy has attempted to identify some of the interpersonal and cultural factors that influence cross-racial attitudes, so that we might be able to gain a deeper understanding into the nature of cross-racial empathy, and in the process break down the invisible barriers that divide "us" and "them".

Contemporary psychological conceptions broadly define *empathy* as the ability to comprehend the emotional states of others by means of vicarious experiences of the same emotions, while remaining aware of the source of those emotions (de Vignemont & Singer, 2006). Empathy is distinguished from *sympathy* (which may arise as a consequence of empathy, but involves a concern for the other and does not necessarily reflect the observed emotion) and *personal distress* (an aversive affective reaction that is self-focused rather than other-focused; Eisenberg, 2000). Some of the suggested functions of empathy in humans include the understanding of emotions in others in order to predict subsequent behaviour, the facilitation of social communication, and an impetus for altruism and prosocial behaviour (de Vignemont & Singer, 2006).

A burgeoning research interest into empathy, and specifically into its implications for social interactions, has revealed it to be a more complex construct than previously presumed. Besides being driven by a network of neurophysiological interactions (Decety, 2011), it is also influenced by dynamic appraisal processes. This term refers to an individual's personal interpretation and evaluation of a situation (de Vignemont & Singer, 2006). One example of a dynamic appraisal process is the grouping of individuals based in racial characteristics, and subsequent racial group identification (i.e., identifying with other members of the same race as an in-group, and identifying others as out-group members). Such racial group identification has attenuating effects on empathic processing and subsequent prosocial

behaviours, such as helping. For instance, individuals are less likely to empathize with, or help, racial out-group members (Echols & Correll, 2012).

But appraisal processes are malleable, and may also be used to overcome racial group biases, thereby increasing prosocial behaviour (Decety, 2011). Additionally, these processes depend on cognitive resources that may be of limited capacity (Echols & Correll, 2012). Despite the large amount of research that has established the attenuating effects of racial biases on empathy and helping, it is not yet clear how felt empathy and cognitive appraisal processes interact to produce helping behaviour.

Literature Review

Component Processes of Empathy

The experience of empathy does not result from the activation of a single neural substrate. Rather, they arise from an elaborate interplay of multiple subsystems, including the endocrine systems, hypothalamic-pituitary-adrenal axis (HPA), autonomic nervous system (ANS), and various parts of the cortex (Porges, 2003). The ANS connects to the limbic system (a set of brain structures commonly associated with motivation and emotion processing) which, in turn, connects to cortical areas involved in emotion evaluation and regulation. Together, these systems allow for both the bottom-up (recognition-arousal) and top-down (cognitive-regulatory) processing of empathy (Decety, 2011).

These interrelated levels of processing rely heavily on each other for optimal functioning. The automatic recognition of emotion and subsequent affective arousal are filtered by attentional and regulatory functions of upstream executive systems. Likewise, input from these bottom-up processes continually updates the top-down systems, allowing for further executive control (Decety & Lamm, 2006). These interconnected mechanisms therefore function together to contribute to the sequential components of empathic processing.

A useful conception of empathic processing distinguishes between three sequential components that operate in collaboration with each other: affective arousal, emotion awareness and understanding, and emotion regulation (Decety, 2011). The *affective arousal* component of empathy is believed to represent the core affect (roughly, appetitive or aversive) of an observed emotion. Affective arousal operates automatically, and involves somato-sensorimotor resonance between the self and other. Observing someone in distress may, for example, lead to similar feelings of distress within the empathic observer. *Emotion awareness and understanding* refers to the synthesis of environmental, social, motivational,

and homeostatic information in order to compute the mental states of others, akin to theory of mind processing (Decety, 2011). This stage of processing also allows the observer to identify his felt distress as an empathic response to someone else's distress. Finally, *emotion regulation* is considered important for prosocial behaviour because empathic over-arousal might result in personal distress (rather than empathy or sympathy), thereby reducing the likelihood of prosocial behaviour (Eisenberg, 2000).

These three sequential components are not independent of each other but continually interact to produce varied empathic experiences, and may additionally be modulated by implicit appraisal processes and by volitional acts of self-regulation (Decety, 2011).

Modulatory Influences on Empathy

During everyday human interaction, we witness multiple instances of emotional experiences in others. Fortunately, similar affective experiences are not always stimulated in response to these observations; if they were, we might find ourselves in perpetual emotional chaos. Empathic responses are thus subject to modulatory processes. These processes may be either voluntary or implicit (de Vignemont & Singer, 2006). Voluntary modulation entails control over emotional responses with experience and practice. Medical professionals, for example, learn to control their empathic responses to distressed patients in order to maintain proficiency.

Implicit modulation refers to appraisal processes that operate rapidly and automatically, and that are influenced by factors such as specific features of the observed emotion, the situational context, the empathizer, and the relationship between the empathizer and the target individual (de Vignemont & Singer, 2006). For example, the empathizer's mood, emotional repertoire, emotion regulation capacity, age, personality, and gender may all bear on the amount of empathy felt. Further, one is likely to respond with greater empathy to those who are more similar and familiar to oneself. Although these modulatory processes may have adaptive advantages (Decety, 2011), they may also give rise to the kinds of discriminatory behaviours that are often observed when people classify themselves into different groups.

Empathy and Intergroup Relations

An evolutionary perspective on the human capacity to empathise highlights advantages this capacity may have held for group living. Improved communication among in-group members would have assisted in the survival and reproduction of the group (Goetz, Keltner, & Simon-Thomas, 2010). An empathic bias toward in-group members could thus have been advantageous for survival of the gene.

An important point to note here is that in-group membership does not merely refer to immediate genetic relatives, but extends to socially constructed groups that may be altered via reappraisal processes (Young & Hugenberg, 2010). Although this group identification can be defined along various dimensions, in South Africa it is often done along racial divides reminiscent of previously-established social structures. The influence of racial group identification has been shown to affect empathic processing on many levels, from basic emotion recognition and affective arousal to emotion understanding (Echols & Correll, 2012).

As noted above, empathic arousal (affective arousal provoked by empathy) is the primary step in empathic processing and involves the spontaneous activation of a core affect in the observer that resembles the emotion experienced in the observed individual. Empathic arousal identifies a stimulus as appetitive or aversive (Decety, 2011), and is manifested in changes in autonomic outflows, which may, in turn, may give rise to approach or avoidance behaviours (Porges, 2003). Thus, if group membership impacts empathic arousal, it may result in differential empathic processing outcomes for in-group and out-group members (i.e., approach vs. avoid). A functional magnetic resonance imaging (fMRI) study investigated empathic processing for racial group membership in Caucasian and Chinese participants (Xu, Zuo, Wang, & Han, 2009). Observation of a painful stimulus activated the anterior cingulate cortex (ACC), the neural substrate representing the affective experience of pain. This effect was modulated by racial group membership, with greater activation for in-group members.

A similar study measured skin conductance response (SCR) as a physiological marker of empathic arousal to the observation of pain in others (Forgiarini, Gallucci, & Maravita, 2011). Empathic reactions (SCR increases) correlated with a measure of implicit racial bias in Caucasian participants. Specifically, in those participants SCR was greatest for Caucasian target individuals, less for Asian individuals, and the least for African individuals. The authors interpreted their results in terms of increasing degrees of dehumanization. The observed reductions in arousal seemed to reflect an increase in prejudice as physical dissimilarities between participants and targets became more pronounced. Hence, it appears that automatic cognitive biases may attenuate the affective sharing of pain for racial out-group members.

Emotion understanding, another high-level step in empathic processing, is equally susceptible to racial group biases. For instance, Cuddy, Rock, and Norton (2007) found that participants ascribed fewer ‘uniquely human’ emotions (e.g., mourning) to out-group members. This finding might again be interpreted in terms of dehumanization, where less

human characteristics are ascribed to individuals deemed to be more dissimilar to the self (Echols & Correll, 2012). Ascribing fewer secondary emotions to members of an out-group further resulted in less helping behaviour toward those individuals (Cuddy et al., 2007).

Empathic Concern and Intergroup Helping

Helping behaviour appears to be motivated by *empathic concern* (feelings of tenderness, sympathy, and compassion) for another in distress (Echols & Correll, 2012). Empathic concern builds on the earlier components of empathic processing, namely empathic arousal and understanding. Hence, it is sensitive to the same kinds of intergroup biases as mentioned earlier. This concern is believed to have extended from the evolution of parental nurturance, and results in approach behaviour (Stocks, Lishner, & Decker, 2009).

Similar situations to those in which empathic concern arises may also lead to personal distress and avoidance, however (Eisenberg, 2000). For instance, when witnessing another person in distress, one may experience feelings of discomfort or anxiety rather than empathic concern. Such discomfort or anxiety may subsequently motivate attempts to escape the situation rather than remaining and offering help. Identification of the mechanisms that lead to either empathic concern or personal distress in similar situations might thus help illuminate differences in helping toward in-group versus out-group members.

Emotion regulation is thought to play an important role in empathic concern and helping, as different levels of arousal should result in different behavioural outcomes. Specifically, observing individuals in distress who are more similar to the observer might result in particularly high emotional arousal (Batson, Fultz, & Schoenrade, 1987). Higher arousal requires more self-focused regulation and could result, paradoxically, in reduced empathic understanding and concern for the in-group member (Echols & Correll, 2012). At the other end of the intergroup spectrum, contact situations with out-group members may increase arousal due to threat responses (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001). In both situations, then, increases in arousal could result in personal distress, reduced empathic concern, and a failure to help when emotion regulation is insufficient (Echols & Correll, 2012).

Studies of helping behaviour toward racial in- and out-groups have produced contradictory results, with some finding no effects of racial bias on helping and others showing either increased or decreased helping of racial out-group members (Dovidio & Gaertner, 1981; Gaertner & Dovidio, 1977). These data suggest that factors other than empathic concern may also prompt actual helping. One suggestion is that helping of in-group members may be motivated by empathic concern, whereas a sense of similarity (feeling

"one" with another) may motivate helping of out-group members (Stürmer & Snyder, 2010). Another factor that could motivate helping is a possible increase in social status that accompanies helping behaviour. This effect has been termed the *competitive altruism hypothesis* (Hardy & Van Vught, 2006). Finally, the *dual-process model* proposes that effortful control can be employed to overcome automatic negative reactions to out-group members, and that this voluntary control can result in prosocial rather than avoidance behaviour (Pryor, Reeder, Monroe, & Patel 2010).

Consistent with the dual-process model, a meta-analytic study proposed that conscious control may modulate implicit racial biases in some situations but not others – specifically, not when cognitive capacity was limited (Saucier, Miller, & Doucet, 2005). The study examined White individuals' helping behaviour toward Black individuals. It found no general tendency for White individuals to discriminate against Black individuals, but did show interesting trends in helping behaviour. Specifically, the analysis revealed that less helping by White individuals toward Black individuals occurred when justifiable, race-neutral rationalisations were available, especially when the costs of helping were high. Thus, if White participants could justify withholding help from Black individuals, they tended not to help. Furthermore, when those participants had to make a decision to help in high-emergency situations (i.e., where an immediate response was necessary), they were less likely to help Black individuals than they were in non-emergency situations. Because the decision to help followed immediately after identification of the target individual, the authors interpreted it as a response to implicit inclinations, before being able to engage in cognitive analyses of what might constitute a racist response. Saucier and colleagues (2005) speculated that racist attitudes resulted in less immediate motivation to help, as such attitudes produced less empathic arousal in participants. The added stress of a high-emergency situation then seemed to increase cognitive load in participants, and thereby decreased their abilities to suppress implicit racial biases.

In summary, the data presented by Saucier et al. (2005), and their interpretations of those data, suggest that individuals seem, cognitively, to justify helping, or not helping, depending on the circumstances. Furthermore, under conditions of decreased cognitive capacity, individuals respond based on their implicit orientations.

Experimental support for the dual-process model was provided by a study that required participants to respond to a hypothetical helping situation after having completed a cognitively demanding task (DeWall, Baumeister, Gailliot, & Maner, 2008). The experimenters manipulated group membership along the dimension of genetic relatedness.

Participants were required to imagine either a family member or stranger in need of help after having been evicted from their apartments. Reported willingness to help a stranger decreased after the cognitive depletion task, whereas reported willingness to help a family member was not influenced.

The authors explained this differential helping behaviour in terms of genetic self-interest. They speculated that helping behaviour produced motivational conflict, as it required the suppression of natural selfish impulses. This suppression seemingly utilized limited cognitive reserves. Helping toward strangers thus decreased after the cognitive depletion task because selfish impulses could no longer be suppressed sufficiently. In the case of genetic relatives, less initial motivational conflict may be produced because genetic selfishness extends to family. Fewer cognitive resources are then required to overcome selfish impulses, resulting in more helping behaviour.

Another recent study suggests that the effects of cognitive depletion are also vulnerable to human reasoning. Job, Dweck, and Walton (2010) showed that the beliefs participants held about the limits of their self-control predicted whether or not this control was influenced by a cognitive depletion task. Specifically, after a cognitive depletion task, those who reported believing that self-control was a limited resource showed declines in performance on a standard measure of self-control. Those who did not report such a belief showed no decline in performance.

In sum, previously published literature suggests that racial biases affect empathic processing at all levels, from empathic arousal to empathic understanding and concern (Echols & Correll, 2012). Because empathic concern acts to motivate helping behaviour, racial biases should lead to less helping toward racial out-group members. However, helping behaviour is not explained fully by empathic concern. Another important factor that may influence helping behaviour is the amount of cognitive resources each individual has available to support appraisal processes. To our knowledge, however, research on helping behaviour toward racial out-group members has not yet investigated the influences of attenuated empathic responses and cognitive depletion within a single research setting.

Aims and Hypotheses

In this study, we aimed to investigate, using both self-report and physiological outcome measures, empathic reactions toward both racial in-group and out-group members following the viewing of empathy-eliciting video clips. Previous studies (e.g., Echols & Correll, 2012; Saucier et al., 2005) suggest that witnessing racial in-group or out-group

members in need/distress may lead to varying outcomes, depending on cognitive depletion influences at different levels of empathic processing. Accordingly, our hypotheses were as follows:

a. There will be less empathic arousal (as measured by degree of physiological arousal) when witnessing out-group members in distress compared to in-group members in distress. Although some research suggests that physiological arousal might increase due to threat reactions for out-group members, such threat reactions are typically elicited in contact situations and should not occur in response to video stimuli.
b. Cognitive depletion will influence empathic arousal if self-regulatory capacity is compromised.
c. Empathic understanding will also be lower for out-group members than for in-group members, given the in-group biases in emotion recognition and empathic arousal that contribute to empathic understanding.
d. The fact that empathic understanding relies on cognitive processes suggests that cognitive depletion will reduce empathic understanding further.
e. Because empathic concern stems from empathic arousal and understanding, it too will be reduced by racial group identification
f. As with empathic understanding, cognitive depletion will also reduce empathic concern.
g. Helping behaviour appears to be motivated by empathic concern and cognitive appraisal processes. Hence, if cognitive resources are depleted, there will be less helping behaviour directed toward out-group members than toward in-group members.

Methods

Research Design and Setting

We used a 2 x 2 mixed factorial design to explore differences in empathic responding in participants as a function of their cognitive depletion and the race of target individuals. The between-groups factor consisted of two levels (cognitively depleted or non-depleted). We varied the level of depletion by having participants engage in a stimulus detection task that was either cognitively demanding or not (Baumeister, Bratslavsky, Muraven, & Tice, 1998; DeWall et al., 2008). The within-groups factor was the race of the target individual (Black or White): Participants viewed a video clip that depicted either a White or a Black individual in distress.

We employed various measures to assess component processes of empathic responding. Each measure served as a separate dependent variable. Self-report measures included questionnaires from which we derived the following DVs: *empathic arousal, emotion understanding, empathic concern*, and *prosocial behaviour*. In addition, we captured physiological arousal by taking several autonomic measures (viz., skin conductance level (SCL), heart rate (HR), root mean square of the successive differences (RMSSD), respiratory sinus arrhythmia (RSA), and preejection period (PEP)). Finally, to explore the link between personality variables and empathic responding, we correlated individual difference measures (including trait empathy, motivations to respond without prejudice, and implicit theories about willpower) with the empathy outcome measures.

All study procedures were conducted in the Department of Psychology at the University of Cape Town (UCT).

Participants

Thirty White undergraduate females (age: $M = 20.81$ years, $SD = 2.96$), recruited through the Department of Psychology's Student Research Participation Program (SRPP), participated. We recruited a female-only sample because of the modulatory influences of sex differences on empathic processing and physiological responding (de Vignemont & Singer, 2006; Manstead, 1992). All participants received course credit via the SRPP.

We assigned each participant to either a cognitively depleted or a non-depleted group ($n = 15$ each). A research assistant decided independently on the grouping scheme so that we, the study's main researchers, were blind to group assignment. Upon arrival, each participant received a sealed questionnaire corresponding to her participant number and containing either a cognitively demanding task or a regular stimulus detection task.

Materials

Video stimuli. To elicit empathic responses in participants, we employed excerpts from the South African Truth and Reconciliation Commission (TRC) hearings. The TRC was assembled after the abolition of apartheid and allowed victims of apartheid violence to offer statements about their past experiences and traumas. In turn, perpetrators of that violence were given the opportunity to testify to request amnesty from prosecution. Video clips portraying scenes from these hearings provide an ecologically valid method of emotion elicitation in South African participants, because the material concerns real experiences of victims of apartheid violence.

The two TRC video clips included in the current study were selected based on the results of an earlier pilot study (see Appendix A). One video clip depicted a White female

and the other a Black female, both recounting their experiences of loss due to apartheid violence. Given that empathic concern is thought to motivate helping behaviour (Echols & Correll, 2012), we used the pilot study to ensure that these two video clips were matched on the amount of reported empathic concern that they elicited in participants.

To control for the cognitive demands imposed by video-clip viewing in general (Rottenberg, Ray, & Gross, 2007), we included two neutral video clips in the design. Neutral-clip excerpts were taken from a video-recorded interview with faculty members at the UCT Department of Medicine (Leaders in Medicine, 2011). One neutral video clip depicted a White female professor and the other video clip a Black female doctor. Both spoke about the UCT curriculum for medical students. The pilot study demonstrated that neither of these video clips produced emotional responses in participants.

All video clips were 2 minutes in length. They were displayed on a 21-inch computer monitor through E-Prime version 2.0 (Psychology Software Tools, Inc., Pittsburgh, USA).

Cognitive depletion task. We used a cognitive depletion task modified by DeWall and colleagues (2008; see Appendix F) from an original task described by Baumeister et al. (1998). This task requires participants to cross out letters on two pages of journal text. In the regular stimulus detection condition, participants are instructed to cross out each occurrence of the letter *e* on both pages. In the cognitively depleted condition, participants follow the same instructions for the first page of text, but receive alternative instructions for the second page. Specifically, on the second page, participants are instructed to cross out all occurrences of the letter *e,* except those that are followed by a vowel, or those that appear in a word containing a vowel two letters before the *e*. Because there are typically many occurrences of the letter *e* on the first page, participants should establish a well-practiced routine before reaching the second page. This routine then needs to be overridden (inhibited) to complete the second page. The task is based the assumption that overriding a routine automatic response requires cognitive self-control, a resource that may be limited. Hence, an overreliance on limited cognitive self-control may produce cognitive depletion (De Wall et al., 2008).

Self-report measures.

***Empathic responding*.** Participants rated all video clips in terms of various empathic component processes using visual analogue scales (VAS) in E-Prime. In particular, video clips were rated according to (a) how much subjective arousal they produced (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). The VAS was a continuous measure that ranged from 0 (e.g., *calm/relaxed*) to 10 (e.g., *aroused/stressed*) for each variable. Higher ratings thus indicated more empathic arousal, understanding, or concern, respectively.

Prosocial behaviour. After rating of all empathy-eliciting video stimuli, we presented participants with a document titled "UCT Social Responsibility Initiative" (see Appendix G). The document measured participants' willingness to help others in distress by giving participants the opportunity to either volunteer time or donate money in response to fabricated appeals by individuals depicted in the TRC video clips. Specifically, they were told that the video clips selected for this study depicted individuals involved in an organisation that promotes development and reconciliation in South Africa (RECON-SA). The document stated that Ginn Fourie (the White individual depicted in the one video clip), inspired by her daughter whom she had lost during the apartheid struggle, ran regular workshops for RECON-SA. The document also stated that Nomonde Calata (the Black individual depicted in the other video clip), who was widowed due to apartheid violence, ran a branch of the organisation that involved co-ordinating development projects. Participants could select the amount of time or number of hours they wanted to contribute to the causes.

Individual differences measures.

Implicit theories about willpower. The Implicit Theories about Willpower questionnaire is a 6-item self-report scale that assesses beliefs regarding the limits of self-control (Job et al., 2010). Participants completed this scale after they had performed all other experimental tasks. The questionnaire sought to assess whether their beliefs about self-control influenced their performance of those tasks. The scale included items such as "After tasks that require a lot of concentration, you need to recover in order to refuel your energy" (limited-resource theory) and "Difficult mental tasks do not depend on how much energy you have, you can keep going even if you are tired" (nonlimited-resource theory). Participants responded on a 6-point rating scale from 1 (*strongly agree)* to 6 (*strongly disagree*), where a higher total value indicates belief in a limited capacity theory of self-control. The scale is internally consistent (α = .89), and has high test-retest reliability (r > .77; Job et al., 2010).

Trait empathy. We used the Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011) to assess trait empathy. The scale contains 31 items, with each requiring responses on a 4-point Likert-type scale (*strongly agree*; *slightly agree*; *slightly disagree*; *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 are designed measure cognitive empathy, whereas the emotion contagion, proximal responsivity, and peripheral responsivity subscales are designed to measure 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 is reliable (α = .85, α = .72, α =.83, α =.65, and α = .70, for each of the five subscales listed above, respectively). Furthermore, the strong correlation between the QCAE and the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) indicates that the former has strong convergent validity. Positive correlations between the QCAE and scores on questionnaires that assess empathic anger, impulsivity, aggression, psychopathy, and Machiavellianism provide evidence for its high construct validity (Reniers et al., 2011).

Motivation to respond without prejudice. We used Internal and External Motivation to Respond without Prejudice scales (IMS/EMS) to assess the different motivations that participants may have for acting in a non-prejudiced manner toward Black individuals (Plant & Devine, 1998). This 10-item scale 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 9-point Likert-type scale, ranging from 1 (*strongly disagree*) to 9 (*strongly agree*); the higher the score, the greater that type of motivation.

Overall, the scale shows good internal consistency for both the IMS (α = .81) and the EMS (α = .80). The scale also has a high test-rest reliability (IMS r = .77, EMS r = .60). Correlations between the IMS/EMS and other measures of prejudice indicate that the scales have good convergent and discriminant validity (Plant & Devine, 1998).

Physiological measures. We recorded physiological responses using the Vrije Universiteit Ambulatory Monitoring System (VU-AMS, Vrije Universiteit, Amsterdam, Holland). The VU-AMS is a portable device that allows recording of the electrocardiogram

(ECG) and impedance cardiogram (ICG) via attachment of electrodes. We obtained these physiological recordings throughout the experiment, and analysed the resulting data in the VU-DAMS software suite. Manually inserted event-markers designated the 2-min periods of video-clip viewing within continuous physiological signal recordings.

ECG and ICG signal recordings were used to extract four measures of physiological responding (SCL, HR, RMSSD, RSA, and PEP). Due to equipment malfunctioning, SCL data were unreliable, and were therefore discarded from further analyses. HR is the number of heart beats per unit of time (usually in minutes) and can decrease in response to parasympathetic nervous system activation, or increase in response to sympathetic nervous system activation. HR is the reciprocal of heart period, or interbeat interval (IBI), which is the time period between upward deflections (R waves) in the QRS complex (Stern, Ray, & Quigley, 2000). Variation in IBIs is known as heart rate variability (HRV). RMSSD provides a time-domain measure of HRV (Task Force, 1996). HRV can also be estimated by frequency-domain measures such as RSA which serves as an index of parasympathetic control of the heart. RSA is characterized by variations in HR in relation to inspiration and expiration (Berntson, Cacioppo, & Quigley, 1993). PEP is the time between the electrical signal that initiates ventricular contraction and the ejection of blood flow into the aorta (Stern et al, 2000). PEP provides an estimate of sympathetic effects on the heart (changes in the force of contraction).

Procedure

After obtaining informed consent (Appendix H), we gave participants a unique number that was subsequently used as identification on all questionnaires. Only one participant was assessed at a time to minimize external distractions. To mask the actual research hypotheses, we told participants that they would be partaking in an "investigation of the different physiological responses to cognitive processing and person processing." They were then asked to complete a demographic information sheet (Appendix E), after which they were seated in front of a computer monitor and fitted with physiological recording electrodes as well as headphones.

Researchers obtained a 2-min baseline physiological recording before presenting participants with the two neutral video clips (one Black individual, one White individual). These video clips were randomised via E-Prime to prevent order effects. After viewing both neutral video clips, participants completed either the cognitively demanding stimulus detection task or the regular stimulus detection task, depending on the experimental condition to which they had been assigned. We then gave participants brief background information

about the two individuals (one Black, one White) depicted in the TRC video clips. Participants then viewed the two TRC video clips, again in randomised order. Directly after presentation of each video clip (neutral and emotional), participants reported their experienced empathy (arousal, understanding, and concern) on the visual analogue scales. The brief delay between video clips acted as a recovery period.

After viewing the empathy-eliciting video clips, participants received a bogus debriefing. They were told that the individuals depicted in the video clips were included as part of a social responsibility initiative at UCT and that they were able to assist these individuals by volunteering time or by donating money to their causes. Participants then had the opportunity to indicate their willingness to assist and, if willing, were told that they would be contacted by the organisation. Finally, they completed the last set of questionnaire measures (i.e.,
Implicit Theories about Willpower, QCAE, & IMS/EMS), after which they received a full debriefing. During the debriefing, the researchers probed participants for suspicion relating to the authenticity of the prosocial measure. Participants were also asked not to discuss the study with others until data collection had been completed.

Ethical Considerations

The current research followed the ethical guidelines outlined by the UCT Codes for Research. We obtained ethical approval from the UCT Department of Psychology Research Ethics Committee prior to commencing data collection.

Regarding consent, confidentiality, and right of withdrawal, participants provided informed consent to partake in the study. Participant responses were anonymous, as questionnaires could be identified solely by participant numbers. All collected data were used for research purposes only, and were stored in a locker to which no one but principal researchers had access. The consent form assured participants that their involvement was voluntary, and that they had the right to withdraw at any stage.

Regarding deception, the study involved procedures to disguise the research hypotheses. Participants did not report any negative impacts due to this deception, however. At the conclusion of the experimental procedures, researchers took care to give participants a full debriefing as to the true aims of the study, and to make sure that they left in a positive state of mind.

Regarding potential psychological, physical, or social harm associated with participation, the TRC stories recounted in the video clips involved witnesses expressing the pain and the suffering they had endured during the apartheid era. These video clips could,

therefore, have led to feelings of distress in some participants. We gave the contact details of a university counselor on the consent form, so that any participant who did experience high emotional distress would have help available to her.

Further to potential harm associated with participation, female researchers attached the VU-AMS electrodes in a private room so as to minimize any participant discomfort.

Regarding benefits of participation, each participant received three SRPP points to help them complete their Duly Performed certificates in Department of Psychology courses.

Data Management and Statistical Analyses

Ambulatory signal scoring. We used the VU-DAMS software suite to extract data from the electrocardiogram (ECG) and impedance cardiogram (ICG) signals. The resulting wave forms were visually inspected for implausible readings, and artefacts in the data were corrected, where possible, or discarded. If more than 10% of the data over a critical period consisted of artefacts, we excluded the affected variable for that particular participant. Additionally, due to equipment malfunctions, some scores reflected implausible physiological reactivity. We used a 3 standard deviation cut-off to discard these implausible scores. Following this reasoning, we excluded the RMSSD data from 1 participant in the non-depleted group; the RSA data from 4 participants in the non-depleted group and 1 participant in the depleted group; and the PEP data from 1 participant in the depleted group. We calculated physiological reactivity scores for each measure by subtracting mean scores for the neutral video clips from mean scores for the empathy-eliciting video clips.

Statistical analyses. We analysed the data using SPSS software version 20 (SPSS, Inc., 2010, Chicago, IL). Dependent samples *t*-tests sought to verify significant increases in self-reported state affect from the neutral to the emotion-eliciting periods. Further inferential statistics for each physiological dependent variable involved a mixed-design ANOVA, with cognitive depletion (depleted vs. non-depleted) and race of target individual (Black vs. White) as independent variables. We split participants' self-report ratings for the emotion condition according to the race of the individual in distress, and correlated these ratings with scores on the individual difference measures. Finally, we correlated participants' self-reported willingness to help with scores on the Implicit Theories about Willpower measure. Statistical significance levels were set at $\alpha = .05$.

Results

Self-Reported Empathic Responding

To confirm that the TRC video clips of Black and White individuals in distress elicited significantly more empathy than the neutral video clips, we performed dependent samples *t*-tests for each self-reported empathic component process. Table 1 indicates that the ratings for each variable increased significantly from the neutral to the emotional video clip, for both Black and White target individuals.

Table 1
Changes in Mean Self-Reported Empathy Rating from Neutral to Emotional Video Clips (N = 30)

		Type of clip		*t*-Test comparisons		
Empathic component	Target	Neutral	Emotional	*t*	*p*	*r*
Arousal	Black	3.39 (1.84)	7.60 (1.24)	-11.78	< .001***	0.91
	White	3.30 (1.65)	7.20 (1.08)	-12.58	< .001***	0.92
Understanding	Black	2.75 (1.95)	9.01 (0.73)	-17.32	< .001***	0.95
	White	3.62 (2.13)	8.40 (0.92)	-10.68	< .001***	0.89
Concern	Black	2.43 (1.77)	8.76 (0.90)	-17.06	< .001***	0.95
	White	2.77 (1.74)	8.40 (0.93)	-17.08	< .001***	0.95

Note. In the third and fourth columns, means are presented with standard deviations in parentheses. Degrees of freedom were (1, 29) for each between-group comparison.
*$p < .05$. **$p < .01$. ***$p < .001$.

We performed a two-way (depletion condition x target individual race) mixed factorial ANOVA to compare self-reported ratings for each empathic component process in response to emotional video clips. Neither the main effect for depletion condition nor the interaction between race and condition was significant for any of the empathic component processes (i.e., empathic arousal, understanding, or concern). However, the main effect for race (greater empathy toward the Black individual than the White individual) was significant for both understanding and concern, $F(1, 28) = 16.55$, $p < .001$, partial $\eta^2 = .37$, and $F(1, 28) = 4.65$, $p = .04$, partial $\eta^2 = .14$, respectively. The main effect for race was not significant for empathic arousal, however, $F(1, 28) = 2.85$, $p = .103$, partial $\eta^2 = .09$.

Physiological Responses

HR. HR decreased from the neutral to the emotional video clips, as reflected by negative mean values for the HR reactivity scores. There were larger decreases for participants in the depleted condition ($M = -5.26$, $SE = 0.89$) than for those in the non-depleted condition ($M = -3.14$, $SE = 0.89$). The two-way (depletion condition x target individual race) mixed factorial ANOVA for HR indicated that the main effect for condition

was not significant, however, $F(1, 28) = 2.87$, $p = .102$, partial $\eta^2 = .09$.[1] The main effect for race and the interaction between race and depletion condition were also non-significant, $p = .851$, partial $\eta^2 = .001$, and $p = .808$, partial $\eta^2 = .002$, respectively (Figure 1A).

RMSSD. RMSSD values increased from the neutral to the emotional video clips. This change was larger for the depleted condition ($M = 10.22$, $SE = 2.30$) than for the non-depleted condition ($M = 4.46$, $SE = 2.38$), although the two-way mixed factorial ANOVA indicated that the main effect for condition was not significant, $F(1, 27) = 3.04$, $p = .093$, partial $\eta^2 = .10$. The main effect for race and the interaction between race and depletion condition were also not significant, $p = .539$, partial $\eta^2 = .01$, and $p = .895$, partial $\eta^2 = .001$, respectively (Figure 1B).

RSA. Similar to RMSSD, RSA values increased from the neutral to the emotional video clips. The two-way mixed factorial ANOVA for RSA indicated that the main effect for condition was significant, $F(1, 23) = 6.16$, $p = .021$, partial $\eta^2 = .21$, such that RSA increases were larger in the depleted condition ($M = 20.92$, $SE = 4.79$) than in the non-depleted condition ($M = 3.00$, $SE = 5.40$). The main effect for race and the interaction between race and depletion condition were again not significant, $p = .396$, partial $\eta^2 = .03$, and $p = .856$, partial $\eta^2 = .001$, respectively (Figure 1C).

RMSSD and RSA reactivity scores were significantly correlated following both Black ($r = .74$, $p < .001$) and White ($r = .91$, $p < .001$) video-clip conditions. This positive association corroborates the fact that RMSSD and RSA both serve as estimates of parasympathetic activity.

PEP. PEP scores decreased from the neutral to the emotional video clips for the non-depleted condition ($M = -2.12$, $SE = 1.27$), but remained more or less stable for the depleted condition ($M = -0.19$, $SE = 1.31$). However, the two-way mixed factorial ANOVA again indicated that the main effect for condition was not significant, $F(1,27) = 1.12$, $p = .300$, partial $\eta^2 = .04$. The main effect for race and the interaction between race and depletion condition were also not significant, $p = .983$, partial $\eta^2 < .001$, and $p = .533$, partial $\eta^2 = .02$, respectively (Figure 1D).

[1]Levene's test of equal variances was non-significant for all physiological variables, apart from HR in the White emotional video clip condition ($p < .05$). However, given equal sample sizes for this analysis, ANOVA should have remained robust to violations of homogeneity of variance.

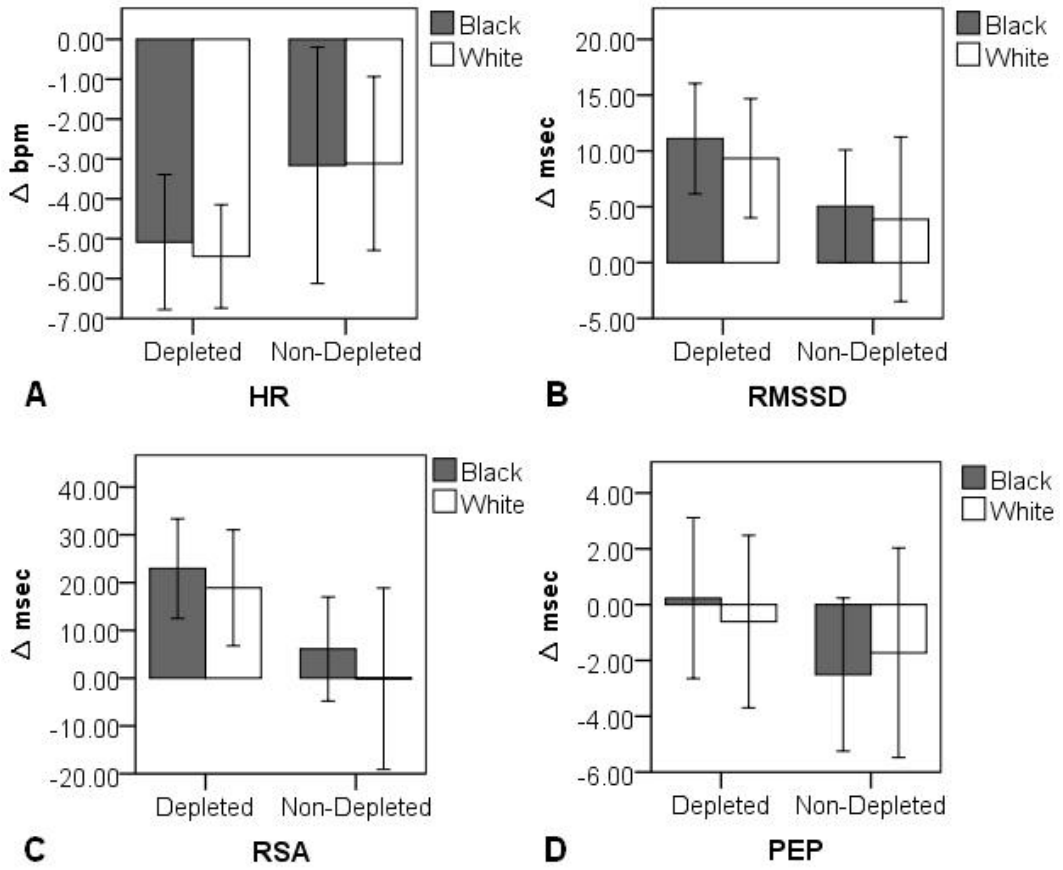


Figure 1. Physiological reactivity scores (from neutral to emotional video clips) for the cognitively depleted and non-depleted conditions, for White and Black individuals in distress, respectively. (A) HR, (B) RMSSD, (C) RSA, (D) PEP. HR: heart rate, RMSSD: root mean square of the successive differences, RSA: respiratory sinus arrhythmia, and PEP: preejection period.

Individual Differences

Relation between personality variables and empathic responding. We correlated self-reported empathy scores (i.e., empathic arousal, understanding, and concern) for video clips depicting individuals in distress with questionnaire measures (i.e., QCAE and IMS/EMS) to assess the relation between pre-existing individual differences and empathic responding. Unlike the physiological responses, there were no significant differences between cognitively depleted and non-depleted conditions for any of the self-reported empathy scores. We therefore collapsed depleted and non-depleted scores for further correlations. Table 2 presents the results of these correlations. Because so many correlations were computed, we interpreted only those significant at $p < .01$.

Table 2 indicates that cognitive empathy (as measured by the QCAE cognitive subscales) correlated significantly with self-reported empathic arousal following viewing of the video clip featuring the Black target individual, and with overall empathic understanding. QCAE affective scores were not significantly correlated with any self-reported empathy

measure. Finally, IMS scores were significantly associated with total scores for empathic arousal and empathic concern. Of significance, however, was the fact that IMS scores correlated significantly with empathic arousal as well as empathic concern following viewing of the video clip of the Black, but not the White, target individual. EMS scores did not correlate significantly with any self-reported empathy measure. The mean IMS scores fell significantly above the scale's mid-point, $t(29) = 13.53$, $p < .001$, and were similar to a sample of high-IMS South African individuals selected (Fourie, Thomas, Amodio, Warton, & Meintjies, under review).

Table 2

Pearson's Correlations Coefficients between Individual Difference Scores and Self-Report Measures (N = 30)

		Empathic arousal			Empathic understanding			Empathic concern		
Individual difference measures	*M* (*SD*)	Black	White	Total	Black	White	Total	Black	White	Total
QCAE cognitive	61.87 (7.80)	.466**	.212	.424*	.361	.438*	.463**	.277	.249	.302
QCAE affective	36.40 (4.31)	.237	.157	.244	-.228	-.060	-.154	.170	.124	.169
IMS	7.67 (1.28)	.482**	.325	.499**	.387*	.209	.330	.556**	.279	.478**
EMS	5.37 (2.35)	-.103	-.037	-.089	-.256	-.213	-.266	-.070	.189	.071

Note. Total scores reflect the mean of each participant's rating for Black and White video clips. QCAE = Questionnaire of Cognitive and Affective Empathy; IMS = Internal Motivation to Respond Without Prejudice Scale; EMS = External Motivation to Respond Without Prejudice Scale.

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

Prosocial helping and its relation to empathic concern and implicit theories about willpower. Our results indicated that participants in the non-depleted condition were more likely to volunteer help (M = 1.57, SE = 0.30), in general, than participants in the cognitively depleted condition (M = 0.80, SE = 0.30) (Figure 2). A mixed factorial ANOVA (depletion condition x target individual race) indicated that the main effect for condition almost reached significance, $F(1, 28) = 3.35$, $p = .078$, partial $\eta^2 = .11$. The interaction effect and main effect for race were not significant, $p = .551$, partial $\eta^2 = .01$, and $p = .170$, partial $\eta^2 = .07$, respectively.

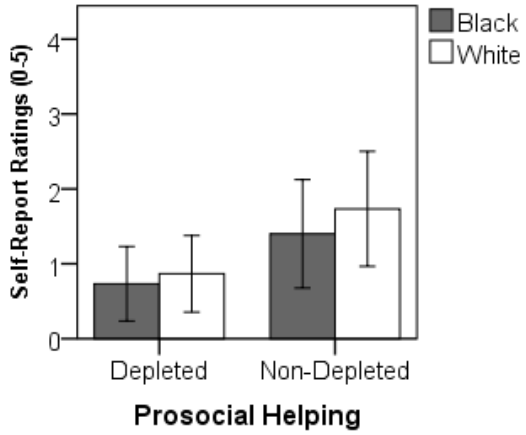


Figure 2. Self-reported willingness to help in the depleted versus non-depleted conditions for White and Black individuals in distress (0: *no response*, 1: *R5/1 hour*, 2: *R25/2 hours*, 3: *R100/5 hours*, 4: *R10 monthly/1 day monthly*, 5: *R100 monthly/4 days monthly*).

To investigate the possible modulatory influences of Implicit Theories about Willpower, empathic concern, and IMS/EMS on prosocial helping, we correlated these measures with each other. Based on the trends found in previous research, we used 1-tailed tests. We expected Implicit Theories about Willpower to be negatively associated with helping in the depleted condition, and empathic concern and IMS/EMS to be positively correlated with helping behaviour in general. We conducted non-parametric Spearman's correlations on data that did not meet assumptions underlying parametric testing.

Table 3 shows that the strongest negative association between Implicit Theories of Willpower and helping were found in the depleted condition. A limited-resource model was thus more consistently related to decreased helping behaviour in the depleted condition, although no correlations reached significance. Correlations within the non-depleted condition showed a moderate positive relationship between empathic concern and reported willingness to help both the Black and the White target individual. However, only correlations for the

Black individual reached significance. IMS and EMS correlations did not reach significance, although higher IMS and EMS scores were, in the non-depleted condition, positively related to helping the Black individual, but were, in the depleted condition, negatively related to helping the Black individual.

Table 3
Spearman's Correlation Coefficients between Prosocial Helping (towards Black and White Individuals), Empathic Concern, and Implicit Theories about Willpower (N =30)

	Prosocial helping			
	Depleted		Non-depleted	
Individual difference measures	Black	White	Black	White
Implicit Theories about Willpower	-.252	-.224	.105	-.139
Empathic concern				
Black	.227	-	.484*	-
White	-	.262	-	.415
IMS	-.218	-	.357	-
EMS	-.401	-	.236	-

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

Discussion

The present study investigated the effects of racial in-group biases and cognitive depletion and on different levels of empathic processing (viz.., empathic arousal, understanding, and concern) and on prosocial helping. We manipulated empathic responding by presenting video clips that depicted either a Black individual or a White individual in distress. Compared to a similar set of neutral video clips, the emotional video clips produced significantly more empathic arousal, understanding, and concern in all participants ($N = 30$ White females).

Contrary to our hypotheses, we found no evidence of attenuated empathic responding as a result of racial group membership: There was no significant main effect of race in terms of physiological responses, and self-report ratings actually indicated increased empathic understanding and empathic concern for the Black compared to the White individual.

We did find significant differences in empathic responding as a result of cognitive depletion effects, however. Participants' physiological responses in the depleted condition were indicative of higher parasympathetic tone and less sympathetic output compared to those in the non-depleted condition. Cognitive depletion also resulted in reduced helping behaviour in general, rather than specifically toward racial out-group members. Finally, higher empathic concern and internal and external motivations to respond without prejudice

were associated with increased helping behaviour in the non-depleted condition only. Cognitive depletion therefore appears to reduce physiological empathic responding; it also appears to attenuate the positive relationship between, on the one hand, empathic helping behaviour and, on the other hand, (a) empathic concern and (b) motivation to respond without prejudice. Our results suggest that an internally driven motivation to respond without prejudice may be more resilient to depletion effects than an externally driven one.

Physiological Responses

We predicted that empathic arousal (as measured by degree of physiological arousal) would be reduced for racial out-group members, compared to in-group members, and that it would be modulated further by the cognitive depletion manipulation. Our physiological arousal measures were HR, RMSSD, RSA, and PEP.

Despite minor trends, race of the target individual did not affect any of the physiological arousal measures significantly. The cognitive depletion manipulation did, however, have some significant effects. HR decreased from the neutral to the emotional video clips, and this decrease was somewhat larger for participants in the depleted condition than those in the non-depleted condition. Such reduction in HR may be explained in terms of increased efferent vagal activity, when considered in combination with other physiological measures. The two measures of parasympathetic activity, RMSSD and RSA, both showed increases from the neutral to the emotional video clips, indicating increased parasympathetic influence on the heart. These increases were significantly larger for participants in the depleted condition compared to those in the non-depleted condition for RSA scores, but only marginally larger for RMSSD scores. Furthermore, some PEP sympathetic output was observed in the non-depleted condition, as reflected by a slight decrease in scores from the neutral to the emotional video clips, whereas PEP scores remained relatively unchanged in the depleted condition. Differentiated responses across the two conditions thus seemed to result from greater vagal control over the heart in the depleted condition that subsequently limited sympathetic output. There are various ways in which to interpret this pattern; we discuss two possibilities.

A common understanding of emotional arousal predicts a general increase in physiological activation following negative emotion elicitation. Recent research shows increasingly, however, that the relationship is not quite that linear (Kreibig, 2010). For instance, research on physiological activation in sadness points to two relatively heterogeneous patterns that include sympathetic-parasympathetic co-activation. One pattern relates to an *activating/crying* sadness and includes (among other physiological markers)

increased HR, increased skin conductance level, increased PEP sympathetic output, and decreased, unchanged, or increased HRV. The other pattern relates to a *deactivating/non-crying* sadness and includes decreased HR, decreased SCR, decreased PEP sympathetic output, and increased or unchanged HRV. The activating sadness pattern is typically observed in response to video clips depicting scenes of impending loss (e.g., a person talking to a dying sibling). Conversely, the deactivating pattern is seen in response to scenes depicting loss that has already occurred (e.g., a person crying over a sibling's death). Given the content of our video clips (i.e., two females recounting the loss of loved ones due to apartheid violence) and the observed decreases in HR from the neutral to the emotional clip, participant responses in this study likely reflect a deactivating sadness pattern. However, PEP decreases in our sample are not quite consistent with a deactivating pattern, and the differential PEP responding across depletion conditions are not accounted for. Furthermore, if decreases in HR and increases in HRV do reflect a deactivating sadness response, then it remains unclear why a more pronounced deactivating sadness response was seen for the depleted compared to the non-depleted condition.

Less sympathetic PEP reactivity in the depleted condition may be explained by an attention allocation account. Orienting toward stimuli involves heightened attention and sensory intake, processes that are associated with cardiac deceleration (Bradley, Codispoti, Cuthbert, & Lang, 2001). Given the salient nature of emotional stimuli, one would expect, relative to neutral stimuli, greater attention allocation to these types of stimuli. Indeed, larger cardiac deceleration was observed in response to emotional video clips compared to neutral video clips, resulting in negative HR reactivity scores. However, these reactivity scores were more substantial in the depleted condition than in the non-depleted condition, suggesting that the cognitive depletion task may have required additional attentional and sensory engagement. Furthermore, sympathetic PEP reactivity in the depleted condition hardly changed from the neutral to the emotional video clips, possibly reflecting reduced empathic arousal due to increased parasympathetic control over the heart (i.e., higher HRV). An attenuated sympathetic response in the depleted condition may have been due to increased vagal efference, aimed at maintaining attention to the cognitive depletion task – at the expense of internal empathic arousal (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996).

In light of an attention allocation explanation, it is questionable whether the cognitive task that we employed actually resulted in cognitive ‘depletion’. It may be that the task merely kept participants cognitively engaged. This possibility does not detract greatly from

our hypotheses: The basic tenet is that cognitive elements somehow interact with empathic arousal, understanding, and concern to moderate helping behaviour, and it is clear that the cognitive task (regardless of whether it was depleting or merely engaging) did influence physiological responding to some degree.

Self-Reported Empathic Responding and Individual Differences

Contrary to our hypotheses, and despite differences in physiological responding, participants did not explicitly report differential empathic arousal, understanding, or concern in the depleted condition compared to the non-depleted condition. No race effect was observed for self-reported arousal, but there were significant race effects for both empathic understanding and empathic concern. However, these effects were in the opposite direction than what we predicted, such that participants reported significantly more empathic understanding and concern for the Black than for the White individual in distress. The same pattern was not reflected in their actual helping, however. Contrary to our hypotheses, there was no difference in reported willingness to help the White individual compared to the Black individual. Participants were only somewhat more likely to report a willingness to help in the non-depleted condition compared to the depleted condition.

To explore these unexpected trends in empathic responding further, we performed a number of correlations. A limited resource model (i.e., high scores on the Implicit Theories about Willpower measure; Job et al., 2010) did seem to negatively influence helping behaviour more in the depleted condition than the non-depleted condition. This influence was minimal, however.

A more interesting finding here was that a higher internal motivation to respond without prejudice (Plant & Devine, 1998) correlated significantly with higher empathic arousal and concern ratings toward the Black individual. Given that empathic concern is thought to motivate helping (Echols & Correll, 2012), we additionally investigated the relationships between helping and measures of empathic concern and IMS/EMS across depletion conditions.

Consistent with earlier findings (Echols & Correll, 2012), participants in the non-depleted condition who reported more empathic concern toward White and Black individuals were more likely to help these individuals by volunteering time or donating money to their causes. In the depleted condition, however, the relationship was much weaker and participants were less likely to help both Black and White individuals even when they reported high empathic concern. Cognitive depletion/engagement thus seemed to weaken the relationship between empathic concern and helping toward both Black and White individuals.

We observed a similar trend for participants who reported a high internal motivation to respond without prejudice. Participants in the non-depleted condition with high IMS scores were more likely to help the Black individual, whereas those with high IMS scores in the depleted condition were less likely to help the Black individual. An externally driven motivation to respond without prejudice was even more affected by the depletion condition: high EMS scores were associated with slightly more helping in the non-depleted condition, but with much less helping in the depleted condition.

These findings suggest that cognitive depletion/engagement may have substantial negative influences on the relationships between IMS/EMS and helping, but that internal motivations to respond without prejudice are more resilient against cognitive manipulation effects than externally driven motivations. The fact that our sample had, on average, high IMS scores could explain why race effects for physiological arousal and helping were not more pronounced. Participants in this sample might have been motivated more by internalized reasons that elicited similar empathic responses to those seen for in-group members. More pronounced racial effects may be observed in a sample with high EMS and low IMS scores, because they would be more motivated by external reasons. Cognitive manipulation may affect external motivations to make one act more selfishly. These conclusions are speculative and in need of replication, however, particularly given that the proposed relationships are based on correlations.

Limitations and Directions for Future Research

Results from the current study provide some support for the effects of cognitive depletion on physiological empathic responding and on helping behaviour. But it is questionable whether the cognitive task employed actually resulted in cognitive depletion or whether it merely kept participants cognitively engaged. Future research would need to establish the effectiveness of the cognitive depletion/engagement manipulation. In the present study design, it was difficult to ascertain depletion effects prior to measurement of empathic responses, but the inclusion of a control condition, where no task is performed (i.e., rest only), may assist future interpretations.

Equipment malfunctions prevented the comparison of participant skin conductance levels (SCL). These data may have provided direct measures of physiological arousal within experimental conditions and thereby informed conclusions about differential physiological profiles across conditions.

The small sample size of the current study makes it more difficult to detect effects due to the experimental manipulation. A sample size of over 100 participants would be needed in order to achieve sufficient power to detect race effects on helping within depletion conditions. Another approach might be to select and contrast participants who fall within the lowest IMS / highest EMS range and the highest IMS / lowest EMS range so that between-group differences become more pronounced.

Finally, it may be useful to include a measure of group identification to establish the degree to which participants actually identify with supposed in-group members, and to determine whether they view in-group members as different from out-group members.

Summary and Conclusion

Our research added to the understanding of empathic processing by revealing how both cognitive appraisal processes and felt empathy are influenced by available cognitive resources. When individuals are engaged in cognitions that are unrelated to the empathy situation, they are less likely to experience sympathetic arousal in response to the distress of others. Subsequent helping toward individuals in distress is similarly impacted by these unrelated cognitions. Our findings support earlier research that linked reduced helping to less initial arousal (Saucier et al., 2005), but not those that suggest reduced helping due to over-arousal and distress responses (Echols & Correll, 2012). These responses may, however, be seen in real-life situations where emotional observations are more stressful and implications more tangible. Like earlier research (Saucier et al., 2005), we did not find any significant racial group effects on helping, but rather trends in helping toward out-group members. Our research identified an interesting link between helping toward out-group members and an internally driven motivation to respond without prejudice to these out-group members. Specifically, we found that increased helping toward out-group members was related to a high internal motivation to respond without prejudice toward out-group members. This relationship disappeared, however, when individuals were cognitively depleted/ engaged, indicating that empathic appraisal processes are modulated by available cognitive resources. An external motivation to respond without prejudice toward out-group members was even more affected by cognitive depletion/engagement, such that individuals with this type of motivation were less likely to help out-group members when cognitively depleted/engaged than those with internally driven motivations. Thus, when aiming to instill a sense of empathy in response to out-group members in distress, a useful approach may be to help individuals develop internal motivations to respond without prejudice, such as having them identify with the out-group members. In conclusion, our findings support the notion that different levels of

empathic processing (from empathic arousal to understanding and concern) are highly inter-related (Decety, 2011), and adds that cognitive depletion/engagement may attenuate responses on a number of these levels at once, resulting in less prosocial behaviour.

References

Batson, D., Fultz, J., & Schoenrade, P. A. (1987). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. *Journal of Personality, 55*, 19-39.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource*? Journal of Personality and Social Psychology, 74*, 1252-1265.

Blascovich, J., Mendes, W. B., Hunter, S. B., Lickel, B., & Kowai-Bell, N. (2001). Perceiver threat in social interactions with stigmatized others. *Journal of Personality and Social Psychology, 80*, 253-267.

Berntson, G. G., Cacioppo, J. T., & Quigley, K. S. (1993). Respiratory sinus arrhythmia: Autonomic origins, physiological mechanisms. *Psychophysiology, 30*, 183-196.

Bradley, M. M., Codispoti, M., Cuthbert, B. N., & Lang, P. J. (2001). Emotion and motivation I: Defensive and appetitive reactions in picture processing. *Emotion, 1*, 276-298.

Cuddy, A. J. C., Rock, M. S., & Norton, M. I. (2007). Aid in the aftermath of Hurricane Katrina: Inferences of secondary emotions and intergroup helping. *Group Processes & Intergroup Relations, 10*, 107-118.

Decety, J. (2011). Dissecting the neural mechanisms mediating empathy. *Emotion Review, 3*, 92-108.

Decety, J., & Lamm, C. (2006). Human empathy through the lens of social neuroscience. *The Scientific World Journal, 6,* 1146-1163.

de Vignemont, F., & Singer, T. (2006). The empathic brain: How, when and why? *Trends in Cognitive Sciences, 10,* 435-441.

DeWall, C. N., Baumeister, R. F., Gailliot, M. T., & Maner, J. K. (2008). Depletion makes the heart grow less helpful: Helping as a function of self-regulatory energy and genetic relatedness. *Personality and Social Psychology Bulletin, 34*, 1653-1662.

Dovidio, J. F., & Gaertner, S. L. (1981). The effects of race, status, and ability on helping behavior. *Social Psychology Quarterly, 44,* 192-203.

Echols, S., & Correll, J. (2012). It's more than skin deep: Empathy and helping behavior across social groups. In J. Decety (Ed.)*, Empathy: From bench to bedside* (pp. 55-71). Cambridge, MA: MIT Press.

Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Review of Psychology, 51*, 665-697.

Forgiarini, M., Gallucci, M., & Maravita, A. (2011). Racism and empathy for pain on our skin. *Frontiers in Psychology, 2*, 1-7.

Fourie, M. M., Thomas, K. G. F., Amodio, D. M., Warton, C. M. R., & Meintjies, E. M. (Under review). Neural correlates of guilt: An fMRI study employing a prejudice paradigm. *Emotion*.

Gaertner, S. L., & Dovidio, J. F. (1977). The subtlety of white racism, arousal, and helping behavior. *Journal of Personality and Social Psychology, 35*, 691-707.

Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin, 136*, 351-374.

Hardy, C. L., & Van Vugt, M. (2006). Nice guys finish first: The competitive altruism hypothesis. *Personality and Social Psychology Bulletin, 32*, 1402-1413.

Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego depletion - is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science, 21,* 1686-1693.

Jolliffe, D., & Farrington, D. P. (2006). Development and validation of the Basic Empathy Scale. *Journal of Adolescence, 29*, 589–611.

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. *Biological Psychology, 84*, 394-421.

Leaders in Medicine (2011, March 31). Leaders in medicine: Interview with faculty at UCT medical school (part 1) [Video file]. Retrieved 16 April 2012 from http://www.youtube.com/watch?v=oAEDKvdvbWQ

Manstead, A. S. R. (1992). Gender differences in emotion. In A. Gale & M. W. Eysenck (Eds.), *Handbook of individual differences: Biological perspectives*. Chichester, England: Wiley.

McVeigh, T. (2011, June 5). South Africa fears new wave of violence against foreigners. Township killings and attacks on shops raise pressure on President Jacob Zuma to act. *The Observer.* Retrieved 16 April 2012 from http://www.guardian.co.uk/world/2011/jun/05/south-africa-violence-foreigners.

Plant, E. A., & Devine, P.G. (1998). Internal and external motivation to respond without prejudice. *Journal of Personality and Social Psychology, 75,*811–32.

Porges, S. W. (2003). The polyvagal theory: Phylogenetic contributions to social behavior. *Physiology & Behaviour, 79,* 503-513.

Porges, S. W., Doussard-Roosevelt, J. A., Portales, A. L., & Greenspan, S. I. (1996). Infant regulation of the vagal "brake" predicts child behavior problems: A psychobiological model of social behavior. *Developmental Psychobiology, 29*, 697-712.

Pryor, J. B., Reeder, G. D., Monroe, A. E., & Patel, A. (2010). Stigma and pro-social behavior: Are people reluctant to help stigmatized persons? In S. Strümer, & M. Snyder (Eds.), *The psychology of prosocial behavior: group processes, intergroup relations, and helping* (pp. 59-80). Malden, MA: Wiley-Blackwell.

Reniers, R. L. E. P., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: A questionnaire of cognitive and affective empathy. *Journal of Personality Assessment, 93*, 84-95.

Rossouw, J. (2008, August). South Africa: not yet post-colonial. *Le Monde diplomatique.* Retrieved 16 April 2012 from http://mondediplo.com/2008/08/03southafrica.

Rottenberg, J., Ray, R. D., & Gross, J. J. (2007). Emotion elicitation using films. In J. A. Coan & J. J. B. Allen (Eds.), *The handbook of emotion elicitation and assessment* (pp. 9-28). London, England: Oxford University Press.

Saucier, D. A., Miller, C. T., & Doucet, N. (2005). Differences in helping white and blacks: A meta-analysis. *Personality and Social Psychology Review, 9*, 2-16.

Stern, R. M., Ray, W. J., & Quigley, K. S. (2000). *Psychophysiological recording*. New York, USA: Oxford University Press.

Stocks, E. L., Lishner, D. A., & Decker, S. K. (2009). Altruism or psychological escape: Why does empathy promote prosocial behavior? *European Journal of Social Psychology, 39*, 649-665.

Strümer, S., & Snyder, M. (2010). *The psychology of prosocial behavior: group processes, intergroup relations, and helping*. Malden, MA: Wiley-Blackwell.

Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996). Heart rate variability: Standards of measurement, physiological interpretation, and clinical use. *European Heart Journal, 17*, 354–381.

Xu, X., Zuo, X., Wang, X., & Han, S. (2009). Do you feel my pain? Racial group membership modulates empathic neural responses. *The Journal of Neuroscience, 29*, 8525-8629.

Young, S. G., & Hugenberg, K. (2010). Mere social categorization modulates identification of facial expressions of emotion. *Journal of Personality and Social Psychology, 6*, 964-977.

Appendix A

Pilot Study: Video Selection

Introduction

We conducted a pilot study in order to match two emotionally arousing video clips, and two neutral video clips to include in the main study "Cognitive Depletion Effects on Empathy and Helping for Racial Out-Group Members." Additionally, we assessed our self-report measures of empathic responding and prosocial helping for readability and clarity of content.

Methods

Participants

Forty undergraduate females (age: $M = 21.97$ years, $SD = 2.82$), recruited through the Department of Psychology's Student Research Participation Program (SRPP), participated in the pilot study.

Materials

Video stimuli. Firstly, we selected excerpts from the Truth and Reconciliation Commission (TRC) hearings in South Africa to create emotionally arousing video clips. Five emotionally arousing TRC video clips were included in the study. Two TRC video clips (White C) depicted a white target individual in distress. Whilst, three TRC video clips (Black E, Black F and Black G) depicted black target individuals in distress. Secondly, we selected two video clips that did not evoke an emotional response, to act as neutral controls in the main study. We selected neutral clip excerpts from a video-recorded interview with faculty members at the University of Cape Town (UCT) medical school (Leaders in Medicine, 2011). One neutral clip depicted a White female professor and the other clip a Black female doctor, both speaking about the UCT curriculum for medical students. Each video clips was 2-minutes in length, and was displayed on a 21-inch computer monitor through E-Prime v2.0 (Psychology Software Tools, Inc., Pittsburgh, USA).

Self-report measures.

Empathy responding. Participants rated video clips in terms of various affective qualities on an empathy scale presented in a booklet (Appendix B). Higher ratings thus indicated more empathic arousal, understanding, or concern, respectively.

Prosocial behaviour. After rating all empathy-eliciting video-stimuli, researchers presented participants with a document titled "UCT Social Responsibility Initiative" (see

Appendix C). Participants had the opportunity either to volunteer time or to donate money in response to fabricated appeals by individuals depicted in the video clips..

Procedure

Upon arrival, we informed participants of the study's aim to select video clips for further research. After signing an informed consent document (Appendix D), participants filled out a demographics form (Appendix E). We then instructed participants to watch the video clips and rate their responses on the appropriate page of the empathy scale booklet. Seven video clips were played in a randomised order. After viewing and rating the video clips, we assessed the empathy rating scale for clarity and readability by asking participants to point out any items that were difficult to understand. Participants were given a bogus debriefing and were presented with a document titled "UCT Social Responsibility Initiative." Participants then had the opportunity to indicate their willingness to assist and, if willing, were told that they would be contacted by the relevant organisation. We then debriefed participants fully, making them aware of the bogus prosocial measure. Finally, we asked participants questions regarding their willingness to contribute to the causes in the prosocial measure. Specifically, participants were questioned on their motivations to help/not help the individuals' causes.

Data Analyses

Dependent samples *t*-tests sought to match video clips according to insignificant differences regarding their mean scores for empathic concern. The empathy scale was evaluated based on participants' reports regarding its comprehensibility and readability. Similarly, the prosocial behaviour measure was evaluated based on participants' responses regarding their decisions to contribute to each cause presented in the measure.

Results and Conclusion

Table 1

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

		Target individual race		*t*-Test comparisons		
Type of clip	Clip contrasts	White	Black	*t*	*p*	*r*
Neutral	White A vs. White B	1.49 (1.30)	1.14 (0.65)	1.56	0.127	0.28
Emotional	White C vs. Black E	7.92 (1.39)	8.24 (1.06)	-1.62	0.113	0.29
	White C vs. Black F	7.92 (1.39)	8.04 (1.34)	-0.59	0.560	0.11
	White C vs. Black G	7.92 (1.39)	8.45 (0.93)	-2.57	0.014*	0.43
	White D vs. Black E	7.11 (1.68)	8.24 (1.06)	-4.02	<.001***	0.60
	White D vs. Black F	7.11 (1.68)	8.04 (1.34)	-3.23	0.003**	0.51
	White D vs. Black G	7.11 (1.68)	8.45 (0.93)	-6.90	<.001***	0.79

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

Dependent sample samples *t*-tests between the two neutral clips indicates no significant difference in self-reported empathic concern, between the two neutral clips (see Table 1). Regarding the TRC emotional video clips, video clip White C and video clip Black E showed no significant differences in self-reported empathic concern. These results suggest contextual similarities between video clip White C and clip Black E. The similarities may be because both target individuals recall experiences of loss due to apartheid violence. Based on these findings, we selected video clip White C and video clip Black E for the purposes of the main study.

Participants' responses regarding the clarity of the empathy scale, deemed the measure suitable for use in the main study and only minor alterations were made to the questions in the scale. In addition, participants' motivations to help causes presented in the prosocial measure was found to depend on the causes each target individual represented, rather than participants' empathic responses toward the individuals depicting in the video clips. We therefore modified the prosocial behaviour measure for further use. Instead of each individual representing a qualitatively different cause, we created a prosocial behaviour measure where both target individuals were responsible for running branches of one main cause.

References

de Vignemont, F., & Singer, T. (2006). The empathic brain: How, when and why? *Trends in Cognitive Sciences, 10,* 435-441.

Manstead, A. S. R. (1992). Gender differences in emotion. In A. Gale & M. W. Eysenck (Eds.), *Handbook of individual differences: Biological perspectives*. Chichester, England: Wiley.

Appendix B

PAGE 1

CLIP 1
Nomonde Calata's recollection
of her late husband Fort Calata.

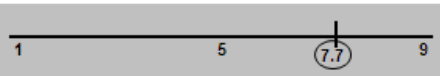
1) How positive or negative did you find the clip?
Please mark **one** option on the scale below.

very negative — *neutral* — *very positive*

1 2 3 4 5 6 7 8 9

Please indicate a value on the scales below between 1 and 9.
The value does not have to be a whole number.

For example:



2) At this moment I feel...

calm / very relaxed — *mildly stressed* — *excited / very stressed*

1 5 9

3) How much distress was the person in the clip experiencing?

no distress — *mild distress* — *a lot of distress*

1 5 9

4) How sad did *you* feel for the person in the clip?

not at all sad — *somewhat sad* — *very sad*

1 5 9

5) How much do you like the person in the clip?

dislike — *neutral* — *like a lot*

1 5 9

Appendix C

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Social Responsibility Initiative

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 assist growth and development in South Africa. The clips selected for this study depicted individuals involved in such organisations. If you would like to support their causes, please view the available options below. Contributions can be made both by monetary donations and volunteering.

Ginn Fourie and Letlape Mphahlele started the ***Lyndi Fourie Foundation****. The foundation offers cultural diversity workshops, undertakes rural development projects, and conducts healing and power work with ex-combatants.*
I wish to volunteer / donate (tick box):

?	?	?	?	?
1 hour/R5 once off	2 hours/R25 once off	5 hours/R100 once off	1 day/R10 monthly	4 days/R100 monthly

Thandi is involved in the ***Rape Crisis Cape Town Trust****, which offers confidential legal advice and support to victims of sexual violence in Cape Town and surrounds. They run annual training courses for volunteers wanting to work directly with clients either as lay counsellors, community educators, community activists, or as court supporters. If you wanted to do any one of these things or make a donation, please indicate below.*
I wish to volunteer / donate (tick box):

?	?	?	?	?
1 hour/R5 once off	2 hours/R25 once off	5 hours/R100 once off	1 day/R10 monthly	4 days/R100 monthly

Nomonde Calata (widow of Fort Calata) is following in the footsteps of her late husband through active involvement in the ***Cradock Youth Association*** *(CRADOYA). CRADOYA aims to produce agents of change and transformation by encouraging youth to take an active interest in the reconstruction and development of their community. In partnership with the government, they aim to deal with issues that directly affect their communities like crime, job creation initiatives, and provision of basic services.*
I wish to volunteer / donate (tick box):

?	?	?	?	?
1 hour/R5 once off	2 hours/R25 once off	5 hours/R100 once off	1 day/R10 monthly	4 days/R100 monthly

Prof. Janet Seggie and Dr. Cynthia Sikakana are actively involved in ***The Rural Students Network****. The organisation aims to develop rural health care systems by recruiting students from rural communities to study at various universities throughout Cape Town. The move to university is a huge social, emotional and financial adjustment for the students. Students benefit greatly from workshops that aim to develop their study skills and help them cope with their new environment.*
I wish to volunteer / donate (tick box):

?	?	?	?	?
1 hour/R5 once off	2 hours/R25 once off	5 hours/R100 once off	1 day/R10 monthly	4 days/R100 monthly

Appendix D

Informed Consent to Participate in Research and Authorization for Collection, Use, and Disclosure of Cognitive Performance 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

Video ratings for UCT Social Responsibility Initiative.

3. Principal Investigator and Telephone Number(s)

Kevin G. F. Thomas, Ph.D.
Senior Lecturer
Department of Psychology
University of Cape Town
021-650-4608

Melike Fourie, PhD.
Department of Psychology
University of Cape Town
021 – 650 3415

4. What is the purpose of this research study?

The purpose of this research is to collect information about the responses people have when they view a selection of video clips.

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

In this experiment we will collect your demographic details. You will then view a number of video clips and rate your responses regarding your reaction to the content of the clips. After the experimental session is over, you will be informed in detail about the design of the study and the research questions we hope to answer with this study. You will also have the opportunity to ask questions and to thus learn more about psychological research.

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 45 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?**
   40
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 information from this study is necessary to help us understand how people react to different video clips in order to assist further research for a social responsibility initiative at UCT.

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 two 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 and your ratings of the video clips. The ratings 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

Appendix E

Participant Number: ____

Date: _____

<u>Demographic Information</u>

Age: ____

Gender: □ Male □ Female

Population Group:

□ White □Black □Coloured □Indian □Asian

□Other (please specify) _____

Nationality: _____

First Language: _____

Number of years of formal (tertiary) education: ____

Appendix F

Cognitive Processing Task

- Cross out all occurrences of the letter *e* **except** those that are followed by a vowel, or those that appear in a word containing a vowel two letters before the *e.*

Given the highly parallel and distributed character of cognitive processing, one of its inherent hazards is *crosstalk interference* between concurrent processes. A succinct description of the problem is provided by Mozer and Sitton (1998): One can conceive of processing … as occurring along a certain neural pathway. If the processing pathways for two stimuli are nonoverlapping, then processing can take place in parallel. But if the pathways cross—i.e., they share common resources or hardware—the stimuli will interact or interfere with one another. (p. 342)

This sort of interference is perhaps easiest to illustrate in the setting of dual-task performance. According to Navon and Miller (1987), concurrently performed tasks interfere with one another when "each produces outputs, throughputs, or side effects that are harmful to the processing of the other one, in that they change the state of some variable that is relevant for the performance of the concurrent task" (p. 435). A concrete example is provided by Shaffer (1975), who showed that dramatic decrements in performance occur in both typing to dictation and reading aloud when an attempt is made to perform these two tasks simultaneously. The difficulty of this combination can be understood as deriving from crosstalk between the processing pathways activated by auditory and visual inputs, leading to conflicting responses at the level of both speech and typing. The result is a slowing of response times and an increase in the frequency of errors, including so-called*crosstalk* errors where the participant produces a response in one modality that should have been delivered in the other.

Conflict between concurrent processes has been understood as affecting performance in an extremely wide variety of domains. Indeed, it has been credited with placing a central limitation on human information-processing capacity: Allport (1987), in agreement with a number of other researchers (e.g., Cohen et al., 1990;Duncan, 1996; Mozer, 1991; Mozer & Sitton, 1998; Navon, 1985; Navon & Miller, 1987; Schneider & Detweiler, 1987), has argued that "the behavioral phenomena attributed in the past to the limited capacity of a central processor are more appropriately conceptualized … as the expression of crosstalk interference between parallel processes" (p. 411).

Appendix G

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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 assist growth and development in South Africa.

The clips selected for this study depicted individuals involved in an organisation that promotes development and restoration in South Africa (RECON-SA) by means of co-operation and communication. If you would like to support the cause, please view the available options below. Contributions can be made both by monetary donations and volunteering.

Ginn Fourie, inspired by her daughter, became actively involved in the organisation and runs regular workshops for RECON-SA.

I wish to volunteer / donate (tick box and circle donation / volunteering):

?	?	?	?	?
1 hour/R5 **once off**	2 hours/R25 **once off**	5 hours/R100 **once off**	1 day/R10 **monthly**	4 days/R100 **monthly**

Nomonde Calata, widow of Fort Calata, runs a branch of the organisation that involves co-ordinating development projects for RECON-SA.

I wish to volunteer / donate (tick box and circle donation / volunteering):

?	?	?	?	?
1 hour/R5 **once off**	2 hours/R25 **once off**	5 hours/R100 **once off**	1 day/R10 **monthly**	4 days/R100 **monthly**

Do you know of any other organisation that you would rather support?

If so, please note the name of the organisation: _____

I wish to volunteer / donate (tick box):

?	?	?	?	?

Appendix H

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.

5. Name of Participant ("Study Subject")

_____

6. Title of Research Study

Cognitive Processing versus Person Processing

7. Principal Investigators and Telephone Numbers

Kevin G. F. Thomas, Ph.D.
Senior Lecturer
Department of Psychology
University of Cape Town
021-650-4608

Melike Fourie, Ph.D.
Department of Psychology
University of Cape Town
021-650-3415

8. 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 cognitive processing and 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. 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. 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.

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?

30

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 information.

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, your ratings of the video clips, 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