

**PSYCHOLOGICAL AND SOCIAL FACTORS PREDICTING PRO-ENVIRONMENTAL
BEHAVIOUR IN THE SOUTH AFRICAN CONTEXT**

by

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DECLARATION

I, Tongase Sara Cilo (student number 43457584), declare that **PSYCHOLOGICAL AND SOCIAL FACTORS PREDICTING PRO-ENVIRONMENTAL BEHAVIOUR IN THE SOUTH AFRICAN CONTEXT** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.

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SUMMARY

The present research aimed first at testing the Theory of Planned Behaviour and the extended model of the Theory of Planned Behaviour in a non-WEIRD nation context (i.e., western, educated, industrialized, rich and democratic); and secondly, at exploring the role of social and economic status not as an outcome of climate change but as a factor that influences the appraisal of climate change and the responses to climate change (i.e., pro-environmental behaviour). Two cross-sectional studies were conducted. Study 1 (N = 452) replicated previous findings in support of the Theory of Planned Behaviour; but also showed the important role of moral obligation and emotions such as guilt. Different to previous research, instrumental rather than experiential attitudes revealed to be associated with intention and pro-environmental behaviour. The latter finding was replicated in Study 2 (N = 681), which also aimed at exploring the role of social and economic status for both appraising climate change as threat and responding to climate change. Both objective and subjective socio-economic status did indeed influence responses to climate change (i.e., pro-environmental behaviour) and whether climate change was appraised as a threat. However, the effects of objective and subjective socio-economic status were opposite than expected. Implications of the present research are outlined in detail with regards to current discourses on appraisals of and responses to climate change.

Keywords: Climate change, pro-environmental behaviour, socio-economic status, situational appraisals, Theory of planned behaviour

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In loving memory of my beloved mother, Maseabata Nhlapo

ABSTRACT

The present research addresses the interplay between the various psychological factors as proposed by the Theory of Planned Behaviour, and social conditions in predicting pro-environmental behavior within the socially and economically unequal context of South Africa. Two studies are reported. Study 1 (N = 452) showed that attitudes, subjective norm and perceived behavioural control predict positively pro-environmental behaviour through behavioural intentions (Hypothesis 1a); and that the consideration of additional factors such as moral norm and anticipated guilt increases the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (Hypothesis 2a and 2b). Study 1 and Study 2 (N = 681) showed that instrumental rather than the assumed experiential attitudes are essential (Hypothesis 1b); and that both objective and subjective socio-economic status influence indeed how people appraise climate change and how they respond to it – although the results pointed in the opposite direction (Hypothesis 3; Hypothesis 4a and 4b).

INTRODUCTION

Human activities contribute both directly and indirectly to climate change (Intergovernmental Panel on Climate Change, 2014). Thus, to deal with anthropogenic climate change, it is pertinent to extend our understanding of people's environmental behaviour which is defined as all types of behaviour that alter the structural dynamics of the ecosystem or the atmosphere (Unanue, Vignoles, Dittmar & Vansteenkiste, 2016, p. 10). Pro-environmental behaviour focuses on minimising the negative impact caused by humans on the natural resources and the environment by engaging in activities that promote a safe and healthy environment (De Groot & Steg, 2009a); such as using public transportation, energy-efficient appliances, home insulation, smart grids and water-saving devices; consuming organic products and recycling of waste (Park & Ha, 2012). Anti-environmental behaviour, on the other hand, involves activities that promote environmental degradation which significantly change the availability of natural resources or alter the structural dynamics of the ecosystem or biosphere (De Groot & Steg, 2009a).

Psychological factors influencing environmental behaviour include among others, perceptions, attitudes, opinions and beliefs of individuals towards the environment (Strydom, 2012). In order to address people's behavioural change from anti-environmental to pro-environmental behaviour, we need to understand the interplay between cognitive, emotional and situational factors that determine their perceptions, attitudes, opinions and beliefs. The three theories that have mainly been used to conceptualise behavioural change are Theory of Planned Behaviour (Ajzen, 1991), Norm-Activation Theory (Schwartz, 1977), and Value-Belief-Norm Theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999).

Although, these theories consider social influence, various meta-analyses have shown that social influence factors such as subjective and personal norms have rather a limited impact on the behavioural intentions and acts (Abrahamse & Steg, 2013; see also Fielding, Terry, Masser, & Hogg, 2008). Consequently, increasing attempts have been made to re-conceptualize social influence with regard to pro-environmental behaviour from the Social Identity Approach (Fielding et al., 2008; Fritsche, Barth, Jugert, Masson, & Reese, 2018). For instance, Fritsche et al. (2018) provide an overview about research demonstrating that identification with environmentalists is positively related with participants' willingness to pay premiums for environmentally friendly products, to participate in collective environmental actions and to engage in environmental activism; and that identification with green consumers explains variance in general pro-environmental intentions over and above the known individual-level predictors such as perceived behavioural control and biospheric value orientation. The present research argues that as much as identities based on ideologies and interests (e.g., political parties, social movements, environmental groups) and socio-cultural orientations (e.g., ethnic background) play an important role in influencing people's pro-environmental intentions, so do socio-economic and social class identities.

The present research, which mainly focusses on recycling behaviour (Study 1 and 2), aims at extending our understanding of the interplay between the various psychological factors and social conditions in predicting pro-environmental behavior within the socially and economically unequal context of South Africa. As it is generally assumed, social and economic inequalities will increase as a result of climate change effects (see for instance Beck, 2010), the present research aims at demonstrating that social and economic inequalities determine how people appraise and respond to climate change.

Climate Change

Climate change and global warming have been portrayed as the biggest human challenges of the 21st century (United Nations Development Program, 2007). The extreme and variable climate such as rising sea levels, changing patterns of precipitation and more frequent and severe extreme weather events are as much a reality in the South African society as in societies globally (CSIR, 2011). However, climate change impact on societies varies by the regions, the relative vulnerability of the population group and the level of exposure to climate change. It has negative effects on economy, water and food security as well as health (CSIR, 2011). Climate change effects add greatly to the hardships in developing countries such as South Africa because of poverty, water and food insecurity, and lack of basic health services (CSIR, 2011). For instance, research showed that approximately 70% of the South African population engages in agricultural activities for livelihood (Hellmuth, Moorhead, Thomson, & Williams, 2007). Consequently, prolonged periods of drought result in severe reduction of crop and stock production, reduction in cattle farming, and the increase in health problems such as malaria and water borne diseases. Thus, failure to sustain these agricultural activities will have negative effects on food security and threaten the lives of the poorer communities in South Africa.

Due to its reliance on coal, South Africa ranks 16th on the global emissions list and its average of 8.9 tonnes per capita is amongst the highest per capita emissions in the developing world (Altieri, 2015). The energy- and emissions-intensive sectors are the mining and mineral sectors which dominate the exports of South Africa (Altieri, 2015). Although, South Africa contributes its share to the existing greenhouse gas level globally; it contributes relatively little in mitigating the anthropogenic origin of climate change locally. For instance, the management of

solid waste is considered as rather ineffective (Ayeleru, Ntuli, & Mbohwa, 2016) and only 10.8% of South African urban households recycle (STATS SA, 2018).

Solid waste management (e.g., paper, organics, plastic, metal, glasses, textile and building rubble) is one of the biggest environmental challenges faced by the South African society. As in many developing countries, most of the South African waste ends up at landfill sites (Department of Environmental Affairs, 2016). This method of municipal solid waste management is unsustainable as it contributes to environmental degradation and global warming through emission of greenhouse gasses such as carbon dioxide (CO₂) and methane (CO₂) (Ayeleru et al., 2016).

Recent studies show that urban households in formal residences have more access to solid waste removal than households in informal settlements (STATS SA, 2018). However, because of the high level of urbanization and migration in South Africa, the informalisation of settlement patterns in cities is increasing. These developments overwhelm most municipalities' capacity to provide adequate waste management services (Dlamini & Simatele, 2016). For instance, lack of road maintenance and infrastructure in informal settlements result in highly inadequate collection and disposal of household refuse; consequently, waste ends up being dumped in open spaces (Simatele, Dlamini & Kubanza, 2017). This has a negative impact on health and environment in those mainly poor communities.

It is therefore considered as essential to formulate and implement effective municipal solid waste management; that is, specific procedures for managing and disposing of solid waste are required that focus on approaches such as composting, energy recovery, separation and recycling (Simelane & Mohee, 2012). Previous research showed that separation and recycling of waste minimise the amount of solid waste that ends up at landfills (Friedrich & Trois, 2011).

Although, the National Environmental Management Waste Act of South Africa (No 59 of 2008) encourages the minimisation of waste production and the re-use and recycling of waste, only about 10% of waste generated was recycled in 2011 (DEA, 2012). According to the Department of Environmental Affairs and Tourism (2005), over 50% of general waste such as paper, glass, cans and metals ending up in landfill sites, have the potential to be recovered for recycling or re-use. Within the South African context, household recycled material consists mainly of plastic and plastic products (81.5%), followed by glass and glass bottles (75.6%), paper and cardboard (60.2%), aluminum and other metals (44.8%), and automotive oil (6.8%) (STATS SA, 2018). More specifically, Ayeleru et al. (2016) showed for one of the landfill sites in the City of Johannesburg (i.e., Robinson deep landfill site) that household and business waste generated and collected at this landfill site consisted of 14% organic waste, 34% plastic, 17% paper and paper board, 9% glass and 8% textile and metal. This waste has the potential to be recovered for recycling or re-use.

Nonetheless, recycling remains inadequately low locally with only 16.2% of households engaging in recycling in the City of Johannesburg (STATS SA, 2018) and nationally with only 10.8% of urban households in South Africa sorting waste and refuse for recycling purposes (STATS SA, 2018). Moreover, recycling in South Africa is more common amongst high socio-economic and elderly headed households than amongst low socio-economic households and households headed by younger individuals (STATS SA, 2018); and high socio-economic households recycle to save energy or natural resources, whereas low socio-economic households commonly recycle for commercial purposes (STATS SA, 2018).

The rather low participation in recycling is mainly attributed to factors such as lack of awareness, lack of access to refuse-removal services and buy-back centers, non-availability of

recycling programmes or recycling containers, and the non-availability of space to sort and store waste material for collection on the private premises (STATS SA, 2018). Besides these situational factors, previous research has shown that whether people recycle and separate waste (i.e., act pro-environmentally) depends also on psychological and social factors. The present research focuses on these psychological factors and social conditions that promote and/or prevent pro-environmental behaviour.

Overview of Theories Explaining Pro-Environmental Behaviour

As mentioned above, most studies that address behavioural change with regard to the environment are based on the Theory of Planned Behaviour (Ajzen, 1991), Norm-Activation Theory (Schwartz, 1977) and Stern's Value-Belief-Norm Theory (Stern et al., 1999). Theory of Planned Behaviour (Ajzen, 1991), which builds on the Theory of Reasoned Action by Fishbein and Ajzen (1974), proposes that behavioural change results from people's evaluation of the changed behaviour as positive (i.e., attitudes). It also results from people thinking that their significant others expect from them or perceiving social pressure from significant others to perform the changed behaviour (i.e., subjective norm). Moreover, it results from people having control in executing the changed behaviour (i.e., perceived behavioural control). The theory further proposes that these factors influence people's intentions (i.e., motivation) and thus their actual behavioural change. The theory also posits that people's perceptions to execute a certain behavioural change (i.e., perceived behavioural control) do not only indirectly (via intentions) but also directly influence their behaviour (Ajzen, 1991, Davies, Foxall, & Pallister, 2002). Theory of Planned Behaviour views self-interest as an important motive for pro-environmental behaviour (see Bamberg & Moser, 2007); in that people make independent decisions to behave

pro-environmentally based on the consideration of the implications of their actions (see also Tonglet, Phillips & Read, 2004). Figure 1 depicts the main assumptions of the Theory of Planned Behaviour.

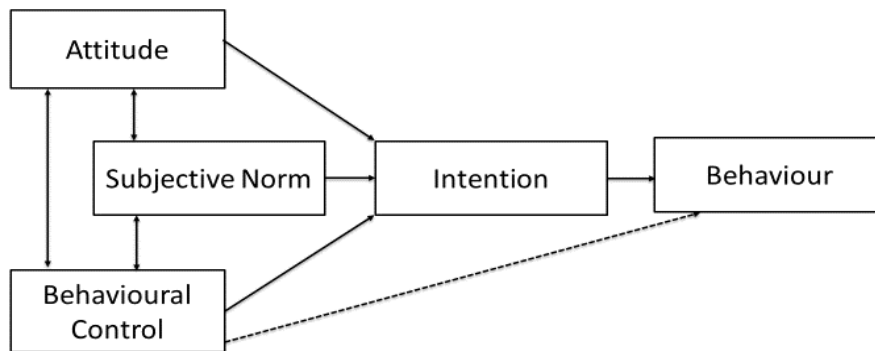


Figure 1. Model of the Theory of Planned Behaviour

On the other hand, Norm Activation Theory by Schwartz (1977), which was originally developed to conceptualize altruistic behaviour, has been applied to study pro-environmental behaviour. It proposes that pro-environmental behaviour occurs as a result of activation of personal norms because of a person's awareness that there is a need (i.e., awareness of need); a person's awareness of his or her inaction (i.e., awareness of consequences); a person's feelings of being responsible (i.e., situational responsibility); the identification of actions (i.e., efficacy); and the person's recognition that she or he has the ability to engage in one or more of the identified actions (i.e., ability) rather than she or he dropping out through inaction (i.e., denial of responsibility). A person's need awareness, the identified actions and the recognition of her or

his ability to act accordingly activate values that generate feelings of obligation (Harland, Staats & Wilke, 2007). Feelings of obligation result from the person's consideration of alternative action strategies for the self. That is, first the physical, material and psychological implications that follow directly from the action; secondly, the implications for the person's held values; and finally, the social implications. The identification of the types of costs and benefits that are related to an action is followed by an evaluation. If the evaluation indicates a clear-cut decision of action or in-action, the decision is final, and a person acts accordingly. However, if the cost-benefit ratio is evenly balanced the person might experience cognitive dissonance, which might result in delaying the decision or in re-examining the situation. The latter might result in denial; that is, a person might deny the need, the action, the ability, and/or the responsibility to neutralize his or her feeling of obligation. Figure 2 depicts the predictions of the Norm-Activation Theory.

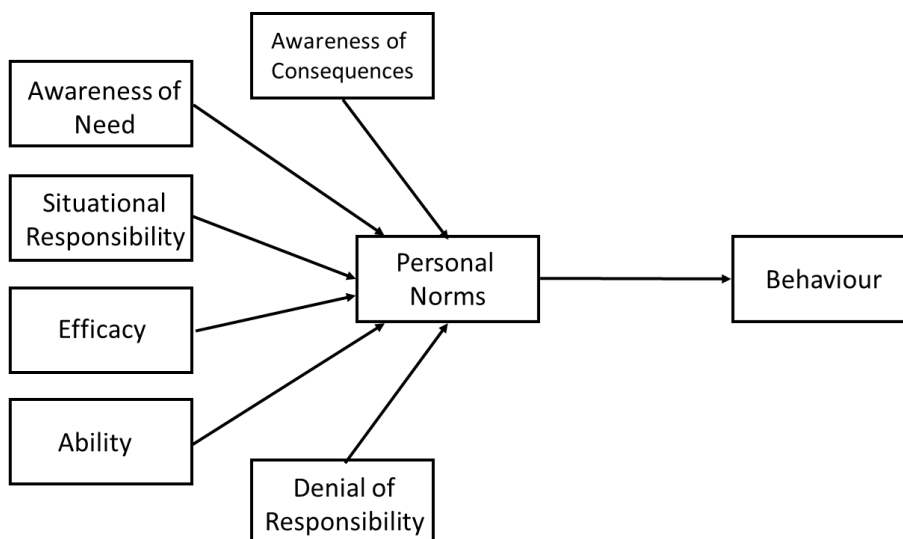


Figure 2. Model of the Norm-Activation Theory

Stern et al.'s (2000) Value-Belief-Norm Theory extends the explanation of the pro-social aspects of the Norm-Activation Theory, by adding the biospheric, altruistic, egoistic values as well as ecological beliefs as antecedents of variables of Norm-Activation Theory (Han, Hwang & Lee, 2016; Dursun, Kabaday & Tuger, 2017). The Value-Belief-Norm Theory proposes that activation of pro-environmental personal norms occurs as an interplay between values (i.e., biospheric, altruistic, and egoistic) and beliefs (i.e., ecological worldview, perceived adverse consequences and the perceived ability to reduce the threat, see Stern et al., 2000, p. 412). For instance, people who hold biospheric values (i.e., environmentally concerned, considers costs and benefits for the ecosystem and biosphere) are more likely to be concerned about environmental conditions that threaten the ecosystem and biosphere, while people who hold altruistic values (i.e., self-transcendent or pro-social, unselfishly concerned about the welfare of others and consider costs and benefits for others) are more likely to be concerned about environmental conditions that threaten the welfare of others. People, on the other hand, who hold egoistic values (i.e., self-enhancement, consider costs and benefits of pro-environmental behaviour for the personal self) are more likely to be concerned about environmental conditions that threaten their personal self-interests. Thus, individuals holding biospheric and altruistic values are likely to share an ecological worldview which increases their awareness of the negative consequences and their responsibility for such consequences which in turn increases the likelihood that they feel a strong sense of moral obligation to act pro-environmentally (Stern et al., 2000; Han et al., 2016; Van Riper & Kyle, 2014; Dursun et al., 2017). On the other hand, egoistic values are assumed to decrease the likelihood of individuals to engage in pro-environmental behaviour (Stern et al., 2000; Van Riper & Kyle, 2014; Dursun et al., 2017). Figure 3 depicts the predictions of the Value-Belief-Norm Theory.

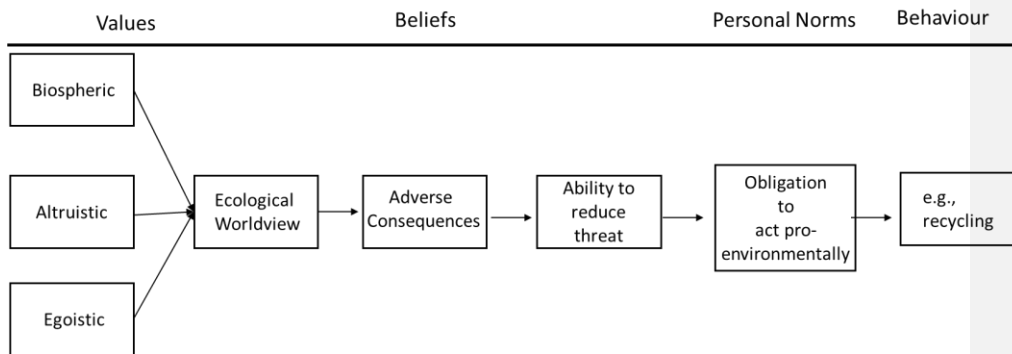


Figure 3. Model of Value-Belief-Norm Theory

Although Theory of Planned Behaviour, Norm-Activation Theory and Value-Belief-Norm Theory aim at explaining pro-environmental behaviour, they differ in their theoretical and conceptual assumptions. Theory of Planned Behaviour stresses the role of motivation (i.e., intention to behave) in mediating the relationship between attitudes, subjective norms and behaviour. On the other hand, Norm-Activation Theory stresses the role of personal norms in mediating the relationship between awareness of need, responsibility, action, ability and behaviour. Lastly, Value-Belief-Norm Theory proposes that pro-environmental behaviour is influenced by ecological beliefs and personal norms that mediate the relationship between values and behaviour.

In other words, pro-environmental behaviour is differently conceptualised by these three theories. While Theory of Planned Behaviour conceptualises pro-environmental behaviour from the perspective of self-interest; Norm-Activation Theory views it as pro-socially motivated (Bamberg & Moser, 2007) and Value-Beliefs-Norm Theory views it as guided by personal values and normative beliefs (Stern et al., 2000). For instance, Theory of Planned Behaviour

explains a person's behaviour from personal expectancy and benefits, while Norm-Activation Theory focuses on a person's behaviour derived from concerns for others and moral belief of what is right and wrong (Park & Ha, 2014). However, all three theories have in common that they consider the role of people's capability to perform the respective behaviour (i.e., behavioural control in Theory of Planned Behaviour; efficacy and ability in Norm-Activation Theory, and capability to take personal action in Value-Belief-Norm Theory) as well as the role of norms. While Theory of Planned Behaviour stresses the role of subjective norms (i.e., expectations and sanction stem from others); Norm-Activation Theory stresses the role of moral norms and Value-Beliefs-Norm Theory stresses the role of pro-environmental personal norms (i.e., expectations and sanction stem from the individual's self) which are experienced as feelings of obligations (see Bamberg & Moser, 2007).

Studies, which used Theory of Planned Behaviour to predict recycling behaviour, explained on average 39% of variance of recycling intention and 27% of variance of recycling behaviour (Armitage & Conner, 2001). The overall result regarding the explained variance of recycling behaviour is consistent with findings of a more recent study (e.g., Strydom, 2018). However, recent studies also deviate from the average explained variance of recycling intention and behaviour as reported by Armitage and Conner (2001). For instance, Tonglet et al. (2004) reported an explained variance of only 26.1% of recycling intention, whereas Strydom (2018) reported an explained variance of as high as 46.4% of recycling intention. The latter corresponds with the findings of Botetzagias, Dima and Malesios (2015) who reported 43.9% of the variance of recycling intention. Although most studies explained more for intention than behaviour (Strydom, 2018; Bamberg & Moser, 2007; Armitage & Conner, 2001), Chan and Bishop (2013) reported opposite results in their study as they explained 39% of the variance in intention and

41% of variance in behaviour. These opposite results, however, might be due to the similarity of the intention and behaviour measurements.

Based on their meta-analytical study, Armitage and Conner (2001) concluded that subjective norm represents the weakest component in predicting recycling intention and behaviour. This conclusion was also supported by more recent studies (Tonglet et al., 2004; Botetzagias et al., 2015). In contrast, Strydom (2018) found that subjective norm was the strongest predictor of recycling intention. It is, however, important to note that the measurement of subjective norm applied by Strydom (2018, p. 53) included not only items assessing social pressure from significant others to perform the changed behaviour (e.g., “Most people important to you want you to recycle”) but also items assessing the situational aspects to recycle (e.g., “For your household to recycle is difficult/easy”).

Discrepancies were also found with regard to the role of perceived behavioural control in predicting behavioural intention. For instance, Tonglet et al. (2004) and Strydom (2018) showed that perceived behavioural control was not a significant predictor of recycling intention, while Botetzagias et al. (2015) found perceived behavioural control to be a significant predictor of recycling intention. The meta-analysis by Armitage and Conner (2001, p. 486) showed that the inclusion of perceived behaviour control added on average 6% to the prediction of intention, over and above attitude and subjective norm.

More consistent were the findings with regard to attitude which, in most studies, was found to be a significant predictor of recycling intention (e.g., Tonglet et al., 2004; Botetzagias et al., 2015; Strydom, 2018; Parkpour, Zeidi, Emamjomeh, Asefzadeh & Pearson, 2014). Moreover, recent studies based on Theory of Planned Behaviour distinguish between experiential (i.e., feeling or affective evaluation of behaviour) and instrumental (i.e., benefits and cost of

engaging in pro-environmental behaviour) attitudes (Wan, Shen & Choi, 2017; Wan, Cheung & Shen, 2012; Tonglet et al., 2004; Davies et al., 2002). These studies showed that experiential attitudes rather than instrumental attitudes predict significantly recycling behaviour and strongly correlate with recycling intention. The results further showed that recycling intentions were stronger for individuals who perceived high levels of subjective norm and experiential attitudes; meaning that, individuals who are strongly encouraged by their significant others and who have positive affective attitudes toward recycling, are showing stronger recycling intention regardless of the benefits (Wan et al., 2017).

Many studies that aimed at predicting recycling behaviour based on the Theory of Planned Behaviour incorporated additional factors into the models they tested. For instance, various studies included besides subjective norm also moral norm (e.g., Chan & Bishop, 2013; Botetzagias et al., 2015; Poskus, 2015). However, the inclusion of moral norm as an additional predictor or as a substitute for attitude brought about conflicting results. For instance, studies conducted by Chan and Bishop (2013), Poskus (2015), and Botetzagias et al. (2015) were not consistent. Chan and Bishop (2013) and Poskus (2015) reported an improvement of the model; whereas Botetzagias et al. (2015) showed that neither the substitution of attitude with moral norm nor the addition of moral norm improved the overall model.

Other factors included were past recycling behaviour (e.g., Tonglet et al., 2004; Wan et al., 2012; Parkpour et al., 2014, Xu, Ling, Lu, & Shen, 2017), environmental concerns (Domina & Koch, 2002; Tonglet et al., 2004; Elgaaied, 2012), situational (Wan et al., 2012; Saphores, Ogunseitani & Shapiro, 2012) and demographic factors (Botetzagias et al., 2015; Parkpour et al., 2014). Past recycling behaviour did not only reveal to be a statistically significant predictor (e.g., Tonglet et al., 2004; Wan et al., 2012; Parkpour et al., 2014) but also the strongest predictor of

recycling intention and behaviour (Xu et al., 2017). Nevertheless, Davies et al. (2002) found that past recycling behaviour was associated with recycling intention but not recycling behaviour. Environmental concerns (Domina & Koch, 2002; Tonglet et al., 2004; Elgaaied, 2012) and situational factors such as convenience (Wan et al., 2012; Saphores et al., 2012) were also significant predictors of recycling intention. The addition of demographic factors such as age and gender showed, however, inconsistent findings. For instance, Botetzagias et al. (2015) found that demographic factors such as age and gender were non-significant predictors of recycling behaviour, while Parkpour et al. (2014) found that age and gender significantly predicted recycling behaviour; in that recycling behaviour increases with age and was more likely among men. Moreover, previous studies found that socio-economic status were weak and insignificant predictors of intention and behaviour (Botetzagias et al. 2015; Zhang, Huang, Yin & Gong, 2015; Davis & Morgan, 2008).

Studies on pro-environmental behaviour which were based on Norm-Activation Theory supported the proposed mediation model whereby each variable chain directly affects the next and may therefore indirectly affect variables further down the chain (De Groot & Steg, 2009b). Most studies focused on awareness of consequences, awareness of need and situational responsibility as predictors of pro-environmental behaviour through personal norm (e.g., Harland et al., 2007; Stern, Dietz & Black, 1986; Hopper & Nielsen, 1991; Bratt, 1999; Kasot & Ozbas, 2015). Contradictory Contradicting results were found in studies that extended the Norm-Activation Theory by including social norm as an intervening variable that influences behaviour through personal norm (Hopper & Nielsen, 1991; Joireman, Lasane, Richards, & Solaimani, 2001; Bratt, 1999). For instance, Hopper and Nielsen (1991) and Joireman et al. (2001) showed that personal norm predicts pro-environmental behaviour when the awareness of consequences

was high. Interestingly, Bratt's (1999) study showed that awareness of consequences had no impact on the relationship between personal norm and pro-environmental behaviour.

Studies based on the Value-Belief-Norm Theory showed that biospheric and altruistic values with a specific worldview were positively related to awareness of consequences and awareness of the problem which influenced ascription of responsibility to engage in pro-environmental behaviour through personal norms; whereas egoistic values were negatively related to awareness of consequences, awareness of the problem and ascription of responsibility to engage in pro-environmental behaviour (Stern et al., 2000; Han et al., 2016). Moreover, Van Riper and Kyle (2014) showed that biospheric-altruistic values not only indirectly but also directly influence personal norm and thus promote pro-environmental behaviour. In contrast, Dursun et al. (2017) showed that altruistic value (benevolence) did not have a significant effect on problem awareness and pro-environmental behaviour as expected. It is, however, important to note that items used by Dursun et al. (2017, p. 89) to assess recycling behaviour were perceived as low-cost behaviour by the participants (e.g., "I keep my garbage in separate piles of glass, plastic, paper, metal for recycling").

Various studies combined the different theories to enhance the understanding of recycling behaviour (e.g., Park & Ha, 2014; Bamberg & Moser, 2007; Onwezen, Antonides & Bartels, 2013; Elgaaied, 2012; Van Riper & Kyle, 2014; Han et al., 2016; Rezvani, Jasson & Bengtsson, 2017) For instance, Park and Ha (2014) based their study on Theory of Planned Behaviour and added the constructs of problem awareness and personal norms. Their results corresponded with Bamberg and Moser's (2007) findings of the meta-analysis that the intention to recycle was directly influenced by attitudes, perceived behavioural control and moral norms; and indirectly influenced by problem awareness [through moral norm](#) and subjective norm [through perceived](#)

[behavioural control, attitudes and moral norm](#). Similarly, Park and Ha (2014) showed that problem awareness influences recycling intentions indirectly through attitudes, subjective norms and moral norms (see also Bamberg & Moser, 2007). Bamberg and Moser (2007) stressed also the role of attribution processes in developing moral norms and in eliciting emotional reactions such as guilt. The role of emotions such as guilt and pride in predicting pro-environmental behaviour has also been studied by Elgaaid (2012), Rezvani et al. (2017) and Onwezen et al. (2013). Their results showed that the effect of personal norm on intention to act pro-environmentally is mediated by emotions. For instance, Rezvani et al. (2017) showed that positive emotions such as pride increase pro-environmental behaviour; while negative emotions such as guilt decrease the likelihood of pro-environmental behaviour. Moreover, research showed that moral norms play an important role in increasing positive emotions (e.g., pride) and in decreasing negative emotions (e.g., guilt) (Rezvani et al., 2017).

As mentioned before, the role of subjective norms as social influence is rather ambiguous. Thus, attempts are increasingly made to re-conceptualize social influence from the Social Identity Approach by conceptualizing social influence as social norms of behaviourally relevant ingroups rather than as social pressure. For instance, Terry, Hogg and White (1999) showed that norms of behaviourally relevant groups influence people's intentions to recycle given that they identify with these groups. The newly proposed Social Identity Model of Pro-Environmental Action by Fritsche et al. (2018) conceptualises social influence as group membership (i.e., social identity) that does not only influence pro-environmental behaviour but also how people appraise and emotionally react to environmental problems.

Social Identity Model of Pro-Environmental Action

The Social Identity Model of Pro-Environmental Action is based on the premise that ingroup identification, collective efficacy beliefs, ingroup norms and ingroup goals influence people's appraisal of the environmental crisis as well as pro-environmental action in both private and public spheres, which may or may not result in pro-environmental behaviour (Fritsche et al., 2018). The model proposes that individual's self-categorization as members of relevant ingroups, as well as the degree to which they identify with these groups, influence their appraisal of environmental crisis which consequently influences their pro-environmental behaviour, or lack of it. The extent to which people perceive their own group as being capable of dealing with environmental crisis influences whether they appraise the crisis as either a threat or a challenge. For instance, if the group is perceived to have the capacity to deal with environmental issues, this may change threat into challenges (Fritsche et al., 2018). Moreover, these social identity processes are prompted by emotions and motivations at a collective level. For example, previous studies showed that the appraisal of ingroup responsibility prompted collective guilt that influenced pro-environmental behaviour (Ferguson & Branscombe, 2010; Mallet, 2012; Mallett, Mechiori, & Strickroth, 2013).

The role of social identity processes has also been shown by Rosenmann, Rees and Cameron (2016), who demonstrated based on the World Value Surveys that identification with all humans and world citizenship correlate with greater willingness to give money directly or indirectly through taxes to address environmental issues. Moreover, previous studies showed that identification with environmentalists influences people's intention to engage in pro-environmental behaviour (Fritsche et al., 2018; Brick, Sherman & Kim, 2017; Dono, Webb & Richardson, 2010; Fielding et al., 2008). For instance, individuals with positive attitudes towards environmentalists and perceiving great normative support for pro-environmental activities show

relatively more intention to engage in pro-environmental behaviour (Fielding et al., 2008). Likewise, identification with environmentally conscious consumers influence individual's identification with organic consumer which in turn influences their green purchasing behaviour (Gupta & Ogden, 2009; Bartels & Reinders, 2010; Bartels & Hoogendam, 2011). On the other hand, highly visible pro-environmental actions strongly influence identification and pro-environmental behaviour, in that individuals engaged more pro-environmentally when pro-environmental activities were visible to other people (Brick et al., 2017).

Thus, social identity processes play a role in appraising environmental crisis and in responding to these crises. Given the diverse context of South Africa, we think it is pertinent to consider these social identity processes. The context of South Africa does distinguish itself from other contexts not only because of its diversity concerning ethnicities, cultures, languages, and religions but also because of its social and economic inequalities. For instance, income inequality which is commonly assessed through the Gini coefficient ("an index that uses a ratio between 0 and 1 to measure inequality where an index of 0 represents a state of total equality where everyone in the society shares the same level of income while an index of 1 reflects a state of complete inequality where one person in the society gets all the income" see STATS SA, 2017, p. 21), scores at .63 for South Africa (STATS SA, 2017). According to World Bank Report (2018), South Africa is therefore one of the most unequal countries in terms of income inequality behind Namibia and Haiti.

Socio Economic Status and Pro-Environmental Behaviour

More specifically, 30.4 million South Africans are living below the upper-bound poverty line, with the black population having the highest proportion with 64.2% (which means that

roughly three out of every five black South Africans are poor) followed by the coloured population with a proportion of 41.3%. The proportion of the Indian population with 5.9 % and the white population with only about 1% are rather small (STATS SA, 2017, p. 58). Rural households living below the upper-bound poverty line are proportional high with approximately 65.6% compared to urban households with approximately 29.2%. Particularly, the poverty among rural South Africans contributes to the rapid growth in the South African cities due to rural migrants searching for employment and a better life. Much of this “former rural and now urban” population settles in townships which increases the informalisation of settlements (Anderson, Romani, Wentzel, & Phillips, 2013; State of South African Cities Report, 2016; Simatele et al., 2017).

Wealth inequality and its implications for climate change appraisals and responses have been increasingly addressed in research. For instance, Tavoni, Dannenberg, Kallis and Loeschel (2011) addressed the question, whether rich nations will go far enough in financing the reduction of CO₂ emissions and adaptation for poorer nations, experimentally based on the public good game. The authors found evidence that “the poor are not willing to compensate for the rich’s inaction” (Tavoni et al., 2011, p. 11828). Vasconcelos, Santo, Pacheco and Levin (2014), on the other hand, simulated the effects of wealth inequality on cooperation which is considered as essential to address climate change. They demonstrated that the poor are sensitive to “cooperation oriented” ingroup members who influence their contribution efforts. Most importantly, it was found that when cooperation (in form of contributions) of the poor is widespread, the rich tend to refrain from it (Vasconcelos et al., 2014, p. 2215).

These differences might result from the fact that socio-economic status differences (i.e., individual’s income, educational attainment and/ or subjective social class) shape people’s

thoughts, feelings and behaviours (Manstead, 2018). For example, Kraus, Piff, Mendoza-Denton, Rheinschmidt and Keltner (2012) propose that lower-class individuals construe their social environment as “contextualism” which refers to a psychological orientation that is motivated by the need to deal with external constraints, external threats and other individuals; whereas high-class individuals construe their social environment as “solipsism” which refers to an orientation motivated by internal states such as emotions and personal goals. These different orientations may influence individuals’ responses to threat. For example, people who grew up in low socio-economic environments are more exposed to threat and might therefore experience their environment as uncertain and constrained; while those from high socio-economic environments are more likely to perceive their environment as full of challenges that can be mastered (Manstead, 2018). Based on these different realities we propose that contextualist lower-class and solipstic upper-class individuals differ on how they appraise climate change. More specifically, we would assume that contextualist lower-class individuals perceive climate change as a greater threat to their livelihood than solipstic upper-class individuals.

Differences between contextualist lower-class and solipstic upper-class individuals have been demonstrated for attribution processes (Kraus, Piff & Keltner, 2009), perceived control (Kraus et al, 2012), prejudice (Kuppens, Spears, Manstead, & Tausch, 2018), collective angst (Jetten, Mols, Healy & Spears, 2017), empathy (Kraus, Cote & Keltner, 2010), generosity (Piff, Kraus, Cote, Cheng & Keltner, 2010), unethical decision making (Piff, Stancato, Cote, Mendoza-Denton & Keltner, 2012) and support for redistribution (Brown-Iannuzzi, Lundberg, Kay, & Payne, 2015; see overview by Manstead, 2018). More specifically, research showed that people from low socio-economic environments are more empathetic, socially engaged, interdependent and generous and give more support to charity relative to people from higher socio-economic

environments (Kraus et al., 2010; Piff et al., 2010). Important for the present research are the findings that people from low socio-economic environments are more likely to attribute social outcomes such as income, inequality and contracting HIV as caused by external factors and outside of their own control (Kraus et al., 2009). If contextualist lower-class individuals tend to externally attribute social outcomes, we would expect that they tend to attribute the causes of climate change externally (i.e., to other groups) and we would assume that the underlying psychological process of this external attribution tendency is psychological control (Jugert, Greenaway, Barth, Bruechner, Eisenhau & Fritsche, 2016).

Research Hypothesis

In sum, most studies addressing pro-environmental behaviour are based on the Theory of Planned Behaviour because it is a parsimonious model that allows the inclusion of additional constructs proposed by other theories such as Norm-Activation Theory and Value-Belief-Norm Theory. In line with previous research, we therefore aimed first to apply and to extend the Theory of Planned Behaviour model by including the concepts of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt.

First, we proposed the hypothesis that attitudes, subjective norm and perceived behavioural control predict positively pro-environmental behaviour through behavioural intentions (**Hypothesis 1a**). Different to previous research (except from Wan et al., 2017; Tonglet et al., 2004; Davies et al., 2002), we distinguished between experiential and instrumental attitudes. More specifically, we hypothesised that pro-environmental intention and behaviour are predicted by experiential rather than instrumental attitudes (**Hypothesis 1b**) as found in previous research (Wan et al., 2017; Tonglet et al., 2004; Davies et al., 2002). Furthermore, we expected

that the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model of the Theory of Planned Behaviour increases the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (**Hypothesis 2**). In line with previous findings, we further hypothesised that all added factors should positively relate with influence pro-environmental intention and behaviour (**Hypothesis 2b**).

Secondly, we aimed at extending our understating about the mechanisms related to socio-economic status relating with influences on the appraisals of and responses to climate change. We therefore explored first whether socio-economic status relates with influences intentions and pro-environmental behaviour as conceptualised by the (extended) Theory of Planned Behaviour (Hypotheses 2 to 2b). Furthermore, we tested the hypothesis that contextualist lower-class individuals appraise climate change more as a threat to livelihood than solipstic upper-class individuals (**Hypothesis 3**). Thirdly, we tested the hypothesis that contextualist lower-class individuals attribute climate change externally (e.g., outside their group's responsibility) (**Hypothesis 4a**); and we further proposed that this relationship to be mediated by perceived lack of control (**Hypothesis 4b**). We tested these hypotheses in two correlative studies.

STUDY 1

The aim of Study 1 was to explore the interplay between the various psychological factors and social conditions in predicting pro-environmental behavior within the socially and economically unequal context of South Africa. To test our hypotheses that attitudes, subjective norm and perceived behavioural control predict positively pro-environmental behaviour through behavioural intentions (**Hypothesis 1a**); that experiential rather than instrumental attitudes predict behavioural intentions and pro-environmental behaviour (**Hypothesis 1b**); that the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt increases the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (**Hypothesis 2a and Hypothesis 2b**); and to explore whether socio-economic status relates with influences intentions and pro-environmental behaviour as conceptualised by the (extended) Theory of Planned Behaviour; we conducted a cross-sectional survey using paper-pencil questionnaires (distributed in a low-income community) and an electronic questionnaire (distributed in a high-income community).

Participants

In total, 452 participants from low-income and high-income communities took part in Study 1. The group representing the low-income community consisted of 344 participants of which 236 participants indicated to be female and 108 to be male. The mean age was 32.68 ranging from 18 to 81 years. The majority reported to belong to the group of Black South Africans (n=335); eight participants indicated to belong to Coloured South Africans and one to the Indian South Africans. The group representing the high-income community consisted of 108 participants of which 70 indicated to be female and 28 to be male (ten participants did not

indicate their gender). The mean age was 43.53 ranging from 21 to 77 years. The majority of participants indicated to belong to Black South Africans (n=62), followed by 29 Whites, four Indians, two Coloureds and one classified him or herself as other.

Participants of both communities indicated on a scale ranging from 1 (less than 2000 Rand) to 6 (more than 30000 Rand) their household's total monthly income after tax. Participants from the low-income community reported a significant lower income ($M = 1.99$, $SD = 1.156$) when compared to participants from the high-income community ($M = 4.97$, $SD = 1.231$), $t(427) = -21.734$, $p < .001$. These results imply that the two groups do indeed differ socio-economically. It is important to note, that the low-income ($M = 32.68$ age mean) and high-income groups ($M = 43.53$ age mean) also differed significantly in age, $t(439) = -7.776$, $p < .001$.

Procedure

Data collection commenced after the research project was ethically approved by the Ethical Clearance Committee of the Department of Psychology (PERC-17043), and the Research Ethical Clearance Committee of the College of Human Sciences (2018-CHS-0022). and the Research Submission Committee of the University of South Africa (2018_RPSC_035).

Participants from low-income communities were conveniently recruited from community centers, households and community organizations located in two Johannesburg townships (Ivory Park and Kaalfontain). Leaders of the various organisations were approached to provide access to community members that use their facilities (i.e., library, social development center, community-based initiatives). Five trained community-based volunteers assisted with data collection. The questionnaire consisted of a cover letter informing participants about the aim of

the study, ethical considerations, procedure and duration. Participants were requested to give consent by ticking a dedicated box on the cover letter of the questionnaire.

Participants from the high-income communities were recruited through estate managers and ratepayers' associations of two Johannesburg suburbs (Beaulieu country estate and Kyalami estate). Members of the respective estates and of the ratepayer's associations were invited via email to participate in the study. They received a link to the electronic version of the questionnaire which was hosted by *Qualtrics*. The email informed potential participants about the aim of study and that starting of the study constituted their consent to participate.

Measurements

If not differently stated, measures were assessed using the answer format ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The order of the measurements in the study corresponds with the order of the measurements reported below. The items within the measures were randomised in the internet-based questionnaire.

Pro-environmental behaviour was assessed by providing participants with ten items that were applied in previous research (Wan et al., 2012, Brick et al., 2017, Whitmarsh & O'Neill, 2010). The items were the following: "I recycle my recyclables regularly", "I have recycled over the past four weeks", "I recycle in my community" (Wan et al., 2012); "I sort my household waste into recycling", "I buy products that can be recycled", "I buy products that have been made from recycled material", "I bring reusable bags with me to the grocery store", "I use reusable water bottles" (Brick et al., 2017); "I recycle items rather than throwing them in the trash", and "I reuse items rather than throwing them in the trash" (Whitmarsh & O'Neill, 2010) ($\alpha = .87$). Participants were asked to indicate their agreement or disagreement with these items.

Experiential attitude was assessed by six items proposed by Wan et al. (2017): “Recycling is good”, “Recycling is useful”, “Recycling is rewarding”, “Recycling is responsible”, “Recycling is sensible”, and “Recycling is hygienic” ($\alpha = .85$).

Instrumental attitude was assessed by the following six items that were reported by Wan et al. (2017): “Recycling reduce pollution,” “Recycling reduce wasteful use of landfills,” “Recycling improves environmental quality,” “Recycling saves energy,” “Recycling saves money”, and “Recycling creates a better environment for future generations” ($\alpha = .87$).

Perceived behavioural control was assessed by seven items that were reported by Tonglet et al. (2004). The items were the following: “I have plenty of opportunities to recycle my household waste”, “Recycling my household waste is convenient”, “Recycling is easy”, “The local council provides satisfactory resources for recycling”, “I know what items of household waste can be recycled”, “I know where to take my household waste for recycling”, and “I know how to recycle my household waste” ($\alpha = .81$).

Convenience as situational factor was measured by four items (Tonglet et al., 2004): “Recycling is too complicated” (reversed), “Recycling takes up too much room” (reversed), “Recycling programmes are a waste of money” (reversed) and “Recycling takes up too much time” (reversed) ($\alpha = .78$).

Moral norm was assessed by seven items that were reported by Tonglet et al. (2004). The items were the following: “ I feel I should not waste anything if it could be used again”, “It will be wrong of me not to recycle my household waste”, “I would feel guilty if I did not recycle my household waste”, “Not recycling goes against my principles”, “Everybody should share the responsibility to recycle household waste”, “I am concerned with maintaining a good place to

live”, and “I have a strong interest in the health and wellbeing of the community in which I live” ($\alpha = .77$).

Subjective norm was assessed by six items that were reported by Wan et al. (2017). The items were the following: “Most people who are important to me think I should recycle”, “Most people who are important to me would approve of my recycling”, “My friends expect me to recycle household materials”, “My family expects me to recycle household materials”, “Media influences me to recycle recyclables”, and “Environmental groups influence me to recycle recyclables” ($\alpha = .83$).

Problem awareness and consequences was assessed by three items that were reported by Elgaaied (2012): “The increase of waste volume is a problem which is likely to have serious repercussions for me and my family”, “The increase of waste volume is a problem which is likely to have serious repercussions at the country”, and “The increase of waste volume is a problem likely to have serious repercussions for animal and vegetal species” ($\alpha = .84$).

Environmental concern was assessed by five items that were reported by Elgaaied (2012). The items were the following: “Thinking about the environmental conditions our children and grandchildren have to live under, worries me”, “When I read newspaper articles about environmental problems or view such TV reports, I am indignant and angry”, “If we continue as before, we are approaching an environmental catastrophe”, “It is still true politicians do far little for environmental protection”, and “For the benefit of the environment we should be prepared to restrict our momentary style of living” ($\alpha = .75$).

Anticipated guilt was assessed by three items (Elgaaied, 2012): “I would feel guilty if I did not recycle on a daily basis during the next three months”, “My conscience would bother me if I did not recycle on a daily basis during the next three months”, and “I would have a bad

conscience towards the environment if I did not recycle my waste on a daily basis during the next three months” ($\alpha = .89$).

Intention was assessed by three items (Wan et al., 2017). The items were the following: “I intend to recycle my recyclables in the next four weeks”, “I will recycle my recyclables every time I have it for disposal”, and “I am willing to participate in the recycling scheme in the future” ($\alpha = .75$).

Socio-Economic Status was assessed as objective and subjective status. The objective status referred to as household’s total monthly income after tax on a scale ranging from 1 (less than 2000 Rand) to 6 (more than 30000 Rand). The subjective status referred to as how participants describe their personal economic position compared to the average South African on a scale ranging from 1 (much worse) to 7 (much better).

After asking participants their demographic particulars (i.e., gender, age, income and race group) additional measures such as identification with the race group as well as emotional responses to various sources of energy were assessed. These measures were used in a different study and are therefore not further reported in the present study.

Results

Preliminary Analysis

Means, standard deviations, and intercorrelations are reported for the whole sample in Table 1 and for the two income groups separately in Table 2. The relationships between the variables were as expected. Intentions to behave pro-environmentally and the actual pro-environmental behaviour correlated positively in the whole sample and in both income groups. All other variables correlated positively with intention and pro-environmental behaviour; except convenience as situational factor. Convenience as situational factor positively correlated with both the intentions to behave pro-environmentally and the actual pro-environmental behaviour in the high-income group but not in the low-income group. In the low-income group, convenience as situational factor was negatively related with pro-environmental behaviour and not related at all with intentions.

Table 1. Means, standard deviations and intercorrelations of the principal variables for the whole sample, Study 1

	1	2	3	4	5	6	7	8	9	10	11	12	13
Mean	3.42	4.26	4.31	3.56	3.42	3.97	3.59	4.17	4.03	3.61	3.96	2.65	4.34
SD	0.93	0.78	0.77	0.81	0.99	0.74	0.98	0.88	0.71	1.10	0.85	1.70	1.75
Min	1	1	1	1	1	1	1	1	1	1	1	1	1
Max	5	5	5	5	5	5	5	5	5	5	5	6	7
1 Pro-environmental behaviour													
2 Experiential attitudes	.28***												
3 Instrumental attitudes	.24***	.74***											
4 Perceived behavioural control	.57***	.31***	.28***										
5 Convenience	-.06	.10*	.13***	.03									
6 Moral norm	.43***	.47***	.50***	.50***	.11*								
7 Subjective norm	.45***	.28***	.31***	.51***	.04	.58***							
8 Problem awareness	.22***	.48***	.50***	.22***	.12**	.45***	.27***						
9 Concern	.28***	.52***	.48***	.26***	.05	.49***	.37***	.65***					

10 Anticipated guilt	.43***	.29***	.34***	.40***	.15**	.54***	.56***	.34***	.45***			
11 Intention	.45***	.43***	.47***	.40***	.11*	.56***	.47***	.42***	.50***	.55***		
12 objective SES	-.12**	.16***	.15**	-	.08*	.19*	-	.19***	.17***	-.09*	.09*	.29
				.16***			.19***					
13 subjective SES	.08*	.01	.06	.08	.07	.11**	.04	.06	.03	.06	.05	.29

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2. Means, standard deviations and intercorrelations of the principal variables for low- and high-income groups, Study 1

		1	2	3	4	5	6	7	8	9	10	11	12	13
Low-income group	Mean	3.48	4.19	4.22	3.64	3.34	3.92	3.67	4.02	3.94	3.63	3.88	1.99	4.13
	SD	0.87	0.79	0.79	0.77	0.98	0.74	0.97	0.89	0.72	1.06	0.84	1.16	1.16
	Min	1	1	1	1	1	1	1	1	1	1	1	1	1
	Max	5	5	5	5	5	5	5	5	5	5	5	6	7
High-income group	Mean	3.24	4.52	4.57	3.27	3.69	4.14	3.31	4.64	4.34	3.55	4.21	4.97	5.11
	SD	1.09	0.70	0.64	0.85	0.96	0.71	0.95	0.65	0.60	1.20	0.84	1.23	1.26
	Min	1	1	1	1	1	1	1	1	1	1	1	1	1
	Max	5	5	5	5	5	5	5	5	5	5	5	6	7
1 Pro-environmental behaviour			.28**	.16	.61***	.39***	.55***	.50***	.22*	.33***	.55***	.58***	-.09	.27
2 Experiential attitudes		.32***		.67***	.31***	.37***	.49***	.49***	.46***	.43***	.34***	.45***	-.03	.10
3 Instrumental attitudes		.30***	.74***		.18	.30**	.46***	.38***	.55***	.46***	.37***	.44***	-.03	.03
4 Perceived behavioural control		.55***	.38***	.37***		.40***	.50***	.51***	.22*	.30**	.47***	.55***	-.01	.28*
5 Convenience		-	.00	.05	.05		.42***	.47***	.29**	.36***	.60***	.53***	-.08	.13

	.20***												
6 Moral norm	.41***	.45***	.50***	.55***	.00		.60***	.46***	.61***	.69***	.72***	.07	.32*
													*
7 Subjective norm	.43***	.29***	.36***	.49***	-.06	.61***		.31**	.40***	.58***	.58***	-.17*	.20*
8 Problem awareness	.28***	.45***	.46***	.32***	.04	.43***	.34***		.57***	.30**	.45***	.04	.05
9 Concern	.32***	.50***	.46***	.32***	-.08	.45***	.43***	.64***		.47***	.68***	.03	.01
10 Anticipated guilt	.38***	.29***	.36***	.37***	.02	.51***	.55***	.39***	.47***		.65***	-.05	.26*
													*
11 Intention	.45***	.40***	.46***	.42***	-.04	.51***	.49***	.39***	.43***	.53***		-.01	.25*
													*
12 Objective SES	-.07	.03	-.02	-.06	-.07	-.06	-.12*	-.06	-.05	-.16**	-.12*		.38*
													*
13 Subjective SES	.07	-.05	.00	.09*	.01	.04	.05	-.03	-.03	.02	-.03	.15**	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. The correlation coefficients for the low-income group is reported in the lower part, whereas the correlation coefficients for the high-income group is reported in the upper part of the table.

Hypothesis Testing

Theory of Planned Behaviour

To test our first two hypothesis that attitudes, subjective norms and perceived behavioural control predict positively pro-environmental behaviour through behavioural intentions (Hypothesis 1a); and that pro-environmental intention and behaviour are predicted by experiential rather than instrumental attitudes (Hypothesis 1b), we regressed in a first model intentions on experiential attitudes, instrumental attitudes, subjective norms and perceived behavioural control and in a second model we regressed pro-environmental behaviour on intentions, experiential attitudes, instrumental attitudes, subjective norms and perceived behavioural control. The first model explained 35.9% of variance of the dependent variable *intention* and was statistically significant, $F(4, 437) = 62.81, p < .001$ (Model 1). The second model explained 38.7% of variance of the dependent variable *pro-environmental behaviour* and was also statistically significant, $F(5, 436) = 56.65, p < .001$ (Model 2). The coefficients of these two models are reported in Table 3.

Table 3. Standardised coefficients for the theory of planned behaviour explaining intention (Model 1) and actual behaviour (Model 2), Study 1

Predictors	Model 1 (outcome intention)		Model 2 (outcome behaviour)	
	Beta	<i>t</i>	Beta	<i>t</i>
Intention			.237	5.07***
Experiential attitudes	.12	2.06*	.07	1.23
Instrumental attitudes	.26	4.53***	-.09	-1.52
Subjective norm	.28	6.26***	.137	2.97**
Perceived behavioural control	.15	3.41**	.402	8.99***

Note: $p < .05^*$; $p < .01^{**}$; $p < .001^{***}$

The results suggest that experiential and instrumental attitudes, subjective norm and perceived behavioural control predict positively intentions and that intentions besides subjective norm and perceived behavioural control predict pro-environmental behaviour (Hypothesis 1a). Moreover, we found significant indirect effects (using Sobel Test Version 4; Mackinnon, Warsi & Dwyer, 1995) from the predictors on pro-environmental behaviour through intention for instrumental attitudes ($Z = 3.39$, $SE = 0.02$, $p < .001$), subjective norm ($Z = 3.95$, $SE = 0.02$, $p < .001$), and perceived behavioural control ($Z = 2.83$, $SE = 0.01$, $p < .01$). The indirect effect from experiential attitudes on pro-environmental behaviour through intention reached only marginal significance ($Z = 1.90$, $SE = 0.02$, $p = .06$). These results support Hypothesis 1a and thus replicate previous findings (Armitage & Conner, 2001; Wan et al., 2012). Different to

Hypothesis 1b which stated that pro-environmental intention and behaviour are predicted by experiential rather than instrumental attitudes, our results indicate that instrumental rather than experiential attitudes relate with influence pro-environmental intentions and indirectly pro-environmental behaviour.

Extended Theory of Planned Behaviour

Secondly, we tested whether the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model of the Theory of Planned Behaviour increases the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (Hypothesis 2). In line with previous findings, we hypothesised that all added factors should positively relate with influence pro-environmental intention and behaviour. To test Hypothesis 2a, we first step-wise regressed intention on experiential attitudes, instrumental attitudes, subjective norms and perceived behavioural control, and in a second step we added the factors moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model.

The adding of the factors improved the model significantly, $\Delta R^2 = .106$, $F(5, 430) = 17.13$, $p < .001$; in that the added predictors explained 10.6% additional variance in the dependent variable *intention* (see Model 1 in Table 4). Moreover, although all added factors were positively related to intention; only instrumental attitude, perceived behavioural control, moral norm, concern and anticipated guilt were statistically significant predictors.

Table 4. Standardised coefficients for the extended theory of planned behaviour model explaining intention (Model 1) and actual behaviour (Model 2), Study 1

Predictors	Model 1 (outcome intention)		Model 2 (outcome behaviour)	
	Beta	<i>t</i>	Beta	<i>t</i>
Intention			.196	3.86***
Experiential attitudes	.043	0.79	0.74	1.30
Instrumental attitudes	.132	2.43*	-.09	-1.50
Subjective norm	.08	1.61	.08	1.58
Perceived behavioural control	.09	2.14*	.39	8.51***
Moral norm	.171	3.35**	.02	0.37
Problem awareness	.042	0.85	-.01	-0.17
Environmental concern	.142	2.76**	-.004	-.06
Convenience as situational factor	.015	0.41	-.11	-3.03**
Anticipated guilt	.237	5.08***	.144	2.85**

Note: $p < .05^*$; $p < .01^{**}$; $p < .001^{***}$

In a second step, we regressed pro-environmental behaviour on intention, experiential attitudes, instrumental attitudes, subjective norms and perceived behavioural control and added in a second step the predictors of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model. The adding of the mentioned factors improved explaining pro-environmental behaviour only slightly, $\Delta R^2 = .022$, $F(5,429) = 3.26$, $p < .01$; in that the added factors explained 2.2% additional variance in behaviour (see Model 2 in Table 4).

In sum, the results of our extended model explaining pro-environmental behaviour suggest that perceived behavioural control is an important predictor of pro-environmental behaviour besides behaviour intentions. Pro-environmental behaviour was also **influenced by** **related with** anticipated guilt and convenience as situational factor. The more people anticipate guilt the more they recycle, which is in line with the findings of Elgaaied (2012). A rather surprising result was that recycling was negatively **related with** **influenced by** convenience (see Table 3). The non-significant relationship between convenience and pro-environmental intention and the significant effect of convenience on pro-environmental behaviour when controlling for all other variables, suggest that this relationship is a rather direct relationship.

The analysis of indirect effects revealed that instrumental attitudes ($Z = 2.06$, $SE = 0.02$, $p < .05$), moral norms ($Z = 2.53$, $SE = 0.02$, $p < .05$), environmental concern ($Z = 2.24$, $SE = 0.02$, $p < .05$) and anticipated guilt ($Z = 3.07$, $SE = 0.01$, $p < .01$) **indirectly-indirectly relate with** **influence** pro-environmental behaviour through intention. The indirect effect of perceived behavioural control on pro-environmental behaviour through intention reached marginal significance ($Z = 1.86$, $SE = 0.01$, $p = .06$). No indirect effects were found for experiential attitudes ($Z = 0.78$, $SE = 0.01$, $p = .43$), subjective norm ($Z = 1.47$, $SE = 0.01$, $p = .14$), problem

awareness ($Z = 0.83$, $SE = 0.01$, $p = .41$) and convenience as situational factor ($Z = 0.42$, $SE = 0.01$, $p = .68$).

In sum, the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model increased indeed significantly the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (Hypotheses 2a and 2b). More specifically, we found that instrumental attitudes, moral norms, environmental concern, anticipated guilt and perceived behavioural control related with influence pro-environmental behaviour through intention. These results suggest that the inclusion of the additional factors in predicting pro-environmental behaviour reduced the direct and indirect effect of subjective norm to zero and it reduced the indirect effect of perceived behavioural control on pro-environmental behaviour through intention to be only marginally significant.

The Role of Socio-Economic Status

To explore whether socio-economic status relate with influences intentions and pro-environmental behaviour besides the proposed factors in the extended version of the Theory of Planned Behaviour, we first regressed intention on the original predictors of the Theory of Planned Behaviour (i.e., subjective norm, attitudes and perceived behavioural control) and its extension (i.e., moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt) and added the objective and subjective socio-economic status into the analysis; and we secondly regressed pro-environmental behaviour on the original predictors of the Theory of Planned Behaviour (i.e., subjective norm, attitudes and perceived behavioural control) and its extension (i.e., moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt) and added the objective and

subjective socio-economic status. The adding of the objective and subjective socio economic status did neither improve to explain the variance in intention to act pro-environmentally, $\Delta R^2 = .005$, $F(2,408) = 1.83$, $p = .162$; nor the variance in pro-environmental behaviour, $\Delta R^2 = .005$, $F(2,407) = 1.68$, $p = .187$. In sum, neither subjective nor objective socio-economic status related influenced directly intention with neither intention nor the actual pro-environmental behavior.

The question is whether objective and subjective socio-economic status relate with influences intention and the actual pro-environmental behaviour indirectly through the factors of subjective norm, experiential attitude, instrumental attitude, perceived behavioural control, moral norm, problem awareness, concern, convenience and guilt as proposed in the extended model of the Theory of Planned Behaviour. We tested the indirect effects using *Process* (Hayes, 2018, # Model 4). We entered into the first model objective socio-economic status/subjective socio-economic status as independent variables; subjective norm, experiential attitude, instrumental attitude, perceived behavioural control, moral norm, problem awareness, concern, convenience and guilt as intervening variables (parallel); intention as dependent variable and subjective socio-economic status/objective socio-economic status as covariate (see Figure 4).

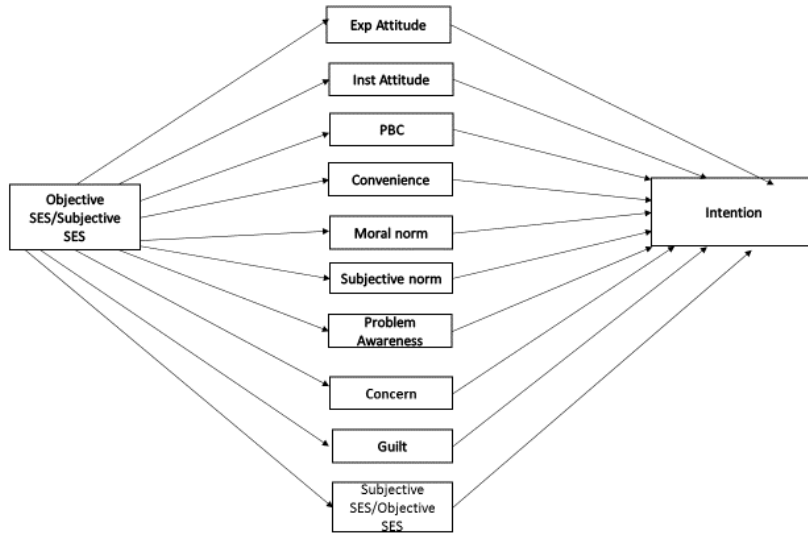


Figure 4. Model of objective/subjective socio-economic status on intention

In a second model we entered objective socio-economic status/subjective socio-economic status as independent variables; subjective norm, experiential attitude, instrumental attitude, perceived behavioural control, moral norm, problem awareness, concern, convenience, guilt and intention as intervening variables; pro-environmental behaviour as independent variable and subjective socio-economic status /objective socio-economic status as covariate (see Figure 5).

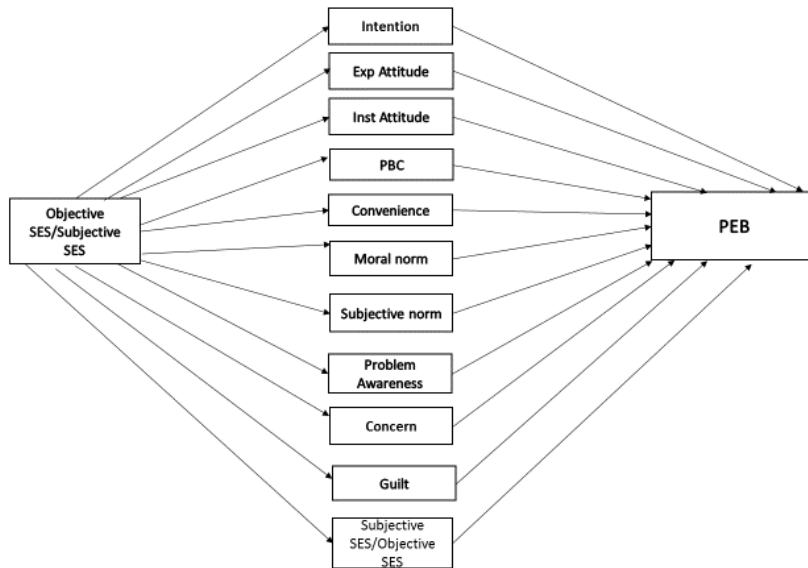


Figure 5. Model of objective/subjective socio-economic status on behaviour

The effects of objective socio-economic status

The overall models for the objective socio-economic status on intention as dependent variable through the above named mediators while controlling for subjective socio-economic status was statistically significant, $F(11, 408) = 31.08, p < .001$ and explained 45.59% of variance of intention (see Figure 4). Objective socio-economic status related with influenced intention only indirectly through *anticipated guilt*, Effect = - 0.016, BootSE = 0.007, BootCI 95% [- 0.0304; -0.0026]¹. Neither the direct effect from objective socio-economic status nor the indirect effects from objective socio-economic status through subjective norm, experiential

¹ Note that the model estimates are the same for the model for subjective SES on intention through the mediators and controlling for objective SES.

attitude, instrumental attitude, perceived behavioural control, moral norm, problem awareness, concern, convenience and anticipated guilt were statistically significant (see Appendix 1).

The overall model for the objective socio-economic status on pro-environmental behaviour as dependent variable through the above named mediators and intention while controlling for subjective socio-economic status was also statistically significant, $F(12, 407) = 21.99, p < .001$, and explained 39.34% of variance of pro-environmental behaviour (see Figure 6)². Objective socio-economic status related with -influenced pro-environmental behaviour indirectly through *instrumental attitudes*, Effect = -0.008, BootSE = 0.005, BootCI 95% [-0.0197; -0.0003], *perceived behavioural control*, Effect = -0.0404, BootSE = 0.0114, BootCI 95% [-0.0647; -0.0198]; and *anticipated guilt*, Effect = -0.0101, BootSE = 0.0061, BootCI 95% [-0.0242; -0.001]. Neither the direct effect of objective socio-economic status nor the other indirect effects were statistically significant (Appendix 2).

The effects of subjective socio-economic status

Subjective socio-economic status related with influenced intention indirectly through *moral norm*, Effect = 0.0082, BootSE = 0.0051, BootCI 95% [0.0004; 0.0199], and *anticipated guilt*, Effect = 0.0119, BootSE = 0.0067, BootCI 95% [0.0003; 0.0267]; and it only related with influenced pro-environmental behaviour as dependent variable indirectly through *perceived behavioural control*, Effect = 0.0265, BootSE = 0.0109, BootCI 95% [0.0063; 0.0486]. Neither the direct nor the other indirect effects were statistically significant (Appendix 3).

Overall, these results suggest that the income of people (i.e., objective socio-economic status) indirectly negatively relates with influences intentions to act pro-environmentally and the

²Note that the model estimates are the same for the model for subjective socio-economic status on pro-environmental behaviour through the mediators and intention as well as controlling for objective socio-economic status.

actual pro-environmental behaviour; whereas people's self-positioning economically (i.e., subjective socio-economic status) indirectly positively relates with influences intentions to act pro-environmentally and the actual pro-environmental behaviour. More specifically, the more income people have (i.e., objective socio-economic status) the less they will feel guilty for not recycling which negatively relates with influences both intentions to act pro-environmentally and pro-environmental behaviour. Moreover, the more income people have (i.e., objective socio-economic status) the less they think to be able to recycle (i.e., perceived behavioural control) and the less they see recycling as beneficial (i.e., saving money) which negatively relates with influences pro-environmental behaviour. On the other hand, people who position themselves as better off economically (i.e., subjective socio-economic status) feel guiltier and feel that recycling is something good to do (i.e., moral norm) which positively relates with influences their intentions to act pro-environmentally. Similarly, those who position themselves as better off economically (i.e., subjective socio-economic status) think to be more able to recycle (i.e., perceived behavioural control) which positively relates with influences their actual recycling behaviour.

In sum, socio-economic status plays indeed an important role for pro-environmental intentions and behaviour, in that both objective socio-economic status (i.e., income) and subjective socio-economic status (i.e., position oneself as better/worse off economically) relate with influence the psychological state and thus indirectly relate with influence pro-environmental intentions and behaviour.

Discussion

Study 1 aimed at extending our understanding about the interplay between psychological factors in predicting intentions to act pro-environmentally and pro-environmental behaviour as conceptualized by the Theory of Planned Behaviour within a socially and economically unequal context such as South Africa (Hypotheses 1 a and 1b). More specifically, we tested whether the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt (Hypotheses 2a and 2b); as well as whether socio-economic status increases the explained variance in intention to act and in acting pro-environmentally.

Our results showed that pro-environmental behaviour was explained directly by intention and by perceived behavioural control and indirectly by attitudes, subjective norm and perceived behavioural control through intention as it is predicted by the Theory of Planned Behaviour. These results support Hypothesis 1a. Different to our second hypothesis (Hypothesis 1b), which stated that experiential rather than instrumental attitudes predict intentions and pro-environmental behaviour, our results showed that instrumental attitudes rather than experiential attitudes play a role in predicting intentions and pro-environmental behaviour.

Moreover, the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model of the Theory of Planned Behaviour increased the explained variance significantly in intention to act pro-environmentally and in pro-environmental behaviour which supports Hypothesis 2a. More specifically, intention was directly positively predicted by instrumental attitudes, moral norm, perceived behavioural control, environmental concern and anticipated guilt; while pro-environmental behaviour was directly positively predicted by intention, perceived behavioural control and anticipated guilt; directly negatively predicted by convenience as situational factor, and indirectly positively

predicted by instrumental attitudes, moral norms, environmental concern, anticipated guilt and perceived behavioural control. Thus, Hypothesis 1b was only partially supported.

Overall, our findings suggest that the Theory of Planned Behaviour indeed explained pro-environmental behaviour and that both perceived behavioural control and anticipated guilt are important direct predictors of pro-environmental behaviour besides intention. Moreover, pro-environmental behaviour does not only seem to depend on the interplay between instrumental attitudes and intentions and perceived behavioural control and intentions but also on the interplay between moral obligation (as norm and as emotion) and intention. The latter supports the notion that social context does not only play an important role in determining what is possible but also what is appropriate.

Lastly, our analysis revealed that neither objective nor subjective socio-economic status predicted directly intention or pro-environmental behaviour. However, both factors revealed to have an indirect – although ambiguous - effect on intention to act pro-environmentally and on pro-environmental behaviour. Objective socio-economic status related ~~influenced~~ negatively with intentions through anticipated guilt; and it related ~~influenced~~ negatively with the actual pro-environmental behaviour through anticipated guilt, behavioural control and instrumental attitudes. Subjective socio-economic status, on the other hand, related with ~~influenced~~ intentions positively through anticipated guilt and moral norm; and it related ~~influenced~~ positively with the actual pro-environmental behaviour through perceived behavioural control.

Some of our results were rather unexpected and need further elaboration. First, the finding that instrumental attitudes rather than experiential attitudes relate with ~~influence~~ intention to act pro-environmentally and to behave pro-environmentally was unexpected because it differs from previous findings (Wan et al., 2017; Wan et al., 2012; Tonglet et al., 2004; Davies et al.,

2002). However, in order to conclude that the effects of instrumental attitudes relative to experiential attitudes in predicting pro-environmental intention and behaviour to be social context dependent, it is necessary to replicate these findings with a different sample – although within the same social context (Study 2).

Secondly, we found that neither objective nor subjective socio-economic status directly related with influenced intention to act pro-environmentally and/or pro-environmental behaviour. However, socio-economic status seems to indirectly relate with influence whether people intend to act and behave pro-environmentally. Interestingly, our findings suggest that the implications of objective socio-economic status for behavioural intention and behaviour is opposite as commonly reported. For, instance, STATS SA (2018) survey showed that wealthier people are more likely to engage in recycling behaviour. The question is whether these socio-economic status effects can be replicated (Study 2). We also aimed at overcoming the limitation of assessing objective and subjective socio-economic status through single questions/construct by applying a composite measure as proposed by Manstead (2018).

To extend our understanding about possible contextual effects about the role of instrumental and experiential attitudes and to study the effects of objective and subjective socio-economic status in predicting pro-environmental behaviour, we conducted a second study. Moreover, Study 2 aimed at testing our hypotheses that contextualist lower-class individuals appraise climate change more as a threat to livelihood than solipstic upper-class individuals (**Hypothesis 3**); that contextualist lower-class individuals attribute climate change externally (e.g., outside their group's responsibility) (**Hypothesis 4a**); and that this relationship is mediated by perceived lack of control (**Hypothesis 4b**).

STUDY 2

Study 2 (as reported here) ~~is~~^{builds} part of a broader research project that addresses political, ideological, socio-economic effects on various climate change appraisals and climate change behaviour. We will only report the measures that are relevant to our present study, namely to test the hypotheses that experiential attitudes rather than instrumental attitudes relate with influence pro-environmental behaviour (Hypothesis 1b), that climate change is appraised as threat to the livelihood by contextualist lower-class individuals rather than by solipstic upper-class individuals (Hypothesis 3); that contextualist lower-class individuals attribute climate change externally (e.g., outside their group's responsibility) (Hypothesis 4a); and that this relationship is mediated by perceived lack of control (Hypothesis 4b).

Participants

Different to Study 1, participants in Study 2 were students registered with the University of South Africa (Unisa). In total, 681 Unisa students participated of which 310 indicated to be female and 358 to be male (13 participants did not indicate their gender). The mean age was 29.18 ranging from 18 to 66 years. The majority reported to belong to the group of Black South Africans (n=423); followed by 175 Whites, 30 Indians, 27 Coloured South Africans, and 17 classified themselves as other (9 participants did not indicate the group they identify with).

Procedure

Data collection commenced after the research project was also ethically approved by the Research Submission Committee of the University of South Africa (2018_RPSC_035) which provides permission to use Unisa students as research participants. Data for Study 2 was

collected through an internet-based questionnaire that was uploaded on the online platform, *Qualtrics*. Students were invited to participate in the study through an email which included the link to the study. The first page of the internet-based questionnaire outlined the aim of the study, ethical considerations, and an estimated duration to complete the study. Participants were further informed that they provided consent to participate in the study by clicking on the *NEXT* button.

Measurements

If not differently stated, measures were assessed using the answer format ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The items within the measures were randomised.

Experiential ($\alpha = .80$) and *instrumental attitudes* ($\alpha = .86$) were assessed with the same items as in Study 1.

Climate change as a threat was assessed by the following two items: “Climate change destroys the world as we know it” and “Climate change threatens the food supply” ($r = .42, p < .001$).

Attribution of Responsibility was assessed as *internal responsibility attribution* measured by the following items: “I feel personally responsible for the environmental problems such as climate change” and “Everybody must take responsibility for the environmental problems such as climate change” ($r = .36, p < .001$); and as *external responsibility attribution* measured by the following item: “Only those who use a lot of resources e.g., electricity, water etc., have to take responsibility”.

Control was assessed as *efficacy* using the following six items: “I am sure that we will find ways to reduce our contribution to climate change”, “I am confident that I will find ways to reduce my contribution to climate change”, “I am certain that we can reduce our CO2 footprint

in a sustainable way”, “I am certain that I can reduce my personal CO2 footprint in a sustainable way”, “Actions against climate change start with myself”, “Actions against climate change start with ourselves” ($\alpha = .85$).

Pro-environmental behaviour was assessed differently in Study 2 when compared to Study 1. While we assessed pro-environmental behaviour in Study 1 as agreement to certain recycling behaviours, we asked in Study 2 how often certain recycling behaviours were performed by the participants in the last three months: “Recycled household waste after sorting it” and “Recycled household waste as expected” ($r = .78, p < .001$).

Objective socio-economic status was assessed by two indicators including income, that is the total monthly income on household level on a scale ranging from 1 (less than 2000 Rand) to 7 (more than 50000 Rand), and parental education, that is the highest qualification of their mothers and fathers ranging from 1 (no schooling at all), 2 (less than 12 years schooling), 3 (Matric), 4 (College, Diploma) and 5 (university). The scores were added up to a final objective socio-economic status score and z-value transferred.

Subjective socio-economic status was assessed by three indicators: income, education and occupation. Participants were provided with a drawing of a ladder and the following instruction: *Think of the ladder as representing where South Africans stand with regard to income, education and occupation. Now please compare yourself with South Africans at the top of the ladder (at Step 10). They have the highest income, the best education and occupations. Now we want you to think about how different you are from these people with regard to income, education and occupation. On which step of the ladder (ranging from 1 to 10) would you place yourself relative to these people at the very top?* Then participants were provided with sliders which they could move from 1 to 10 indicating their position with regard to income, education, and occupation

relative to South Africans on the top (at Step 10). A final score was computed by adding up the three individual scores relating to income, education, and occupation and z-value transferred.

As demographic particulars gender, age, and race group were assessed.

Results

Preliminary Analysis

Means, standard deviations, and intercorrelations are reported in Table 5. All variables correlated positively with pro-environmental behaviour; except objective socio-economic status which negatively correlated with pro-environmental behaviour. The relationship between subjective socio-economic status and pro-environmental behaviour was not statistically significant.

Table 5 Means, standard deviations and intercorrelations of the principal variables, Study

2

	1	2	3	4	5	6	7	8	9
Mean	4.49	4.25	2.11	4.32	4.56	4.71	3.08	-0.02	0.00
SD	0.82	0.81	1.29	0.66	0.66	0.53	1.31	0.81	0.83
Min	1	1	1	1	1	1	1	-2	-2
Max	5	5	5	5	5	5	5	2	2
<hr/>									
1 Threat									
2 Internal Responsibility	.41***	-							
3 External Responsibility	-.02	-.06	-						
4 Control	.41***	.50***	-.07	-					
5 Instrumental Attitude	.29***	.24***	.05	.39***	-				
6 Experiential Attitude	.27***	.28***	.03	.37***	.65***	-			
7 Pro-Environmental Behaviour	.08*	.12**	.09*	.22***	.19***	.14***	-		
8 Objective SES	.05	-.54	-.07	-.06	-	-.07	-	-	
9 Subjective SES	-.09*	-.11*	-.02	-.14***	-	-	.05	.44***	-
					.22***	.15***			

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Hypotheses Testing

First, we tested the Hypothesis (1b) whether experiential rather than instrumental attitudes predict pro-environmental behaviour. Our result of Study 1 revealed the opposite in that instrumental rather than experiential attitudes predicted intentions and pro-environmental behaviour. To test our hypothesis, we regressed pro-environmental behaviour as dependent variable on experiential and instrumental attitudes as independent variable in a multiple regression. The model explained 3.5% of variance of the dependent variable pro-environmental behaviour and was statistically significant, $F(2, 678) = 13.44, p < .001$. As in Study 1, we found that only instrumental ($\beta = .19, p < .001$) but not experiential attitudes ($\beta = .01, p = .80$) predict pro-environmental behaviour. Thus, we replicated our finding of Study 1, which suggests that the role of experiential and instrumental attitudes in predicting pro-environmental behaviour are seemingly social context dependent.

Secondly, we tested the hypothesis that contextualist lower-class individuals appraise climate change more as a threat to their livelihood than solipstic upper-class individuals (Hypothesis 4). To test this hypothesis, we regressed the threat appraisal on the objective and subjective socio-economic status. The model explained 1.5% of variance of the dependent variable *threat appraisal* and was statistically significant, $F(2, 678) = 4.01, p < .01$. Both objective socio-economic status ($\beta = .19, p < .05$) and subjective socio-economic status ($\beta = -.14, p < .01$) predicted threat appraisal in that the less participants report to be objectively economically better off (contextualist lower-class individuals) the less they perceive climate change as a threat; whereas the less participants report to be subjectively economically better off (contextualist lower-class individuals) the more they perceive climate change as a threat. These results support our Hypothesis 4; but only for subjective socio-economic status.

We further tested the hypothesis that contextualist lower-class individuals are more likely to attribute climate change externally rather than internally than solipstic upper-class individuals by regressing internal and external responsibility attributions on objective and subjective socio-economic status in two separate regression analysis. The [analysis analyies](#) revealed a non-significant model, $F(2, 676) = 1.587, p = .21$, for external responsibility attribution but a significant model, $F(2, 676) = 4.29, p < .05, R^2 = .01$, for internal responsibility attribution. Internal responsibility attribution was predicted by subjective socio-economic status ($\beta = -.11, p < .05$) but not objective socio-economic status ($\beta = -.006, p = .886$). These results imply that the less participants report to be subjectively economically better off (contextualist lower-class individuals) the more they attribute responsibility internally. These results, however, do not support Hypothesis 4a which hypothesised that contextualist lower-class individuals attribute climate change externally (e.g., outside their responsibility) (Hypothesis 4a). Moreover, these results and most importantly the result that control and external responsibility did not significantly correlate (see Table 5) make it redundant to test Hypothesis 4b which stated that the relationship between socio-economic status and external attribution is mediated by lack of control.

Discussion

Study 2 tested whether we could replicate our finding of Study 1 that instrumental rather than experiential attitudes predict pro-environmental behaviour; and whether contextualist lower-class individuals appraise climate change more as a threat to livelihood than solipstic upper-class individuals (Hypothesis 3); and whether the contextualist lower-class individuals are more likely

to attribute climate change externally than solipstic upper-class individuals (Hypothesis 4a); a relationship to be mediated by perceived lack of control (Hypothesis 4b).

Our results replicated our findings of Study 1 that pro-environmental behaviour was only explained by instrumental attitudes. Secondly, we found that objective socio-economic status predicted positively, and subjective socio-economic status predicted negatively the appraisal of climate change as a threat. These results supported Hypothesis 3 only partially. Lastly, our analyses revealed that neither objective nor subjective socio-economic status predicted external responsibility attribution. Only internal responsibility attribution was predicted by subjective but not objective socio-economic status which overall does not support Hypothesis 4a and which made the test of Hypothesis 4b redundant.

GENERAL DISCUSSION

The overall aim of this research project was to extend our understanding about what makes people act pro-environmentally. We addressed this question from two perspectives: the first perspective perceptive focused on pro-environmental behaviour as behavioural change (Study 1) and the second perspective focused on situational appraisals that relate with influence pro-environmental behaviour (Study 2). Moreover, we took the severe unequal social and economic context of South Africa into consideration by assessing the role of both objective and subjective socio-economic status for pro-environmental behaviour.

The perspective on pro-environmental behaviour as behavioural change (Study 1) was mainly conceptualised from the Theory of Planned Behaviour; whereby assumptions mainly conceptualised by the Norm-Activation Theory were considered. Based on these theories and previous empirical studies we hypothesised first that attitudes, subjective norm and perceived behavioural control predict positively pro-environmental behaviour through intentions (Hypothesis 1a). We further hypothesised that experiential rather than instrumental attitudes predicts intentions and pro-environmental behaviour (Hypothesis 1b). We also hypothesised that the inclusion of moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model of the Theory of Planned Behaviour increases the explained variance in intention to act pro-environmentally and in pro-environmental behaviour (Hypothesis 2a) and that all added factors should positively relate with influence pro-environmental intention and behaviour (Hypothesis 2b).

Overall, our findings suggest that the Theory of Planned Behaviour is an appropriate and useful model for explaining recycling behaviour. Our results replicated previous findings, in that how people think and feel about recycling (i.e., experiential and instrumental attitude), how

people experience significant others about recycling (i.e., subjective norm) and how people perceive their own capacity to engage in recycling (i.e., perceived behavioural control) directly relates with influence their intention to engage in recycling behaviour, which supports Hypothesis 1a. Our results further showed that instrumental attitudes, subjective norm and perceived behavioural control indirectly relate with influence recycling behaviour through the intention. Experiential attitude did, however, neither directly nor indirectly through intention relates with influence recycling behavior. This result was found both in Study 1 and 2 which contradicted our assumption as stated in Hypothesis 1b.

The results of Study 1 showed that the predictors as proposed by the Theory of Planned Behaviour explained 35.9% of the variance in recycling intention and 38.7% of the variance in recycling behaviour which implies that there are other factors than those proposed by the Theory of Planned Behaviour that appear to play a role in explaining recycling behaviour. To enhance our understanding about what makes people to engage in recycling behaviour, we added factors such as moral norm, problem awareness, environmental concern, convenience as situational factor, and anticipated guilt into the model of Theory of Planned Behaviour. The added factors explained 10.6% additional variance in recycling intention and only 2.2% additional variance in recycling behaviour. These results and that all added factors related with influenced intentions to act pro-environmentally as well as pro-environmental behaviour positively provided evidence that support Hypothesis 2a and Hypothesis 2b. Moreover, our results suggest that whether people are concerned about their environment does indeed relate with influence their pro-environmental behaviour; that subjective norms seem to be part of moral norms; and that because of these moral norms people act pro-environmentally because of emotions such as guilt.

Our second perspective focused on pro-environmental behaviour and appraisals such as climate change as a threat being related with influenced by socio-economic status. Based on previous research we hypothesised that contextualist lower-class individuals appraise climate change more as threat to livelihood than solipstic upper-class individuals (Hypothesis 3), that contextualist lower-class individuals tend to attribute climate change rather externally (e.g., outside their group’s responsibility) (Hypothesis 4a); and that this relationship is mediated by perceived lack of control (Hypothesis 4b).

The results particularly of Study 1 showed that socio-economic status did not directly but only indirectly relates with influence recycling behaviour through selected factors of the extended model of the Theory of Planned Behaviour. More precisely, objective socio-economic status related with influenced pro-environmental behaviour negatively indirectly through instrumental attitudes, anticipated guilt and perceived behavioural control; whereas subjective socio-economic status related with influenced pro-environmental behaviour positively indirectly through perceived behavioural control. These results imply that the more “objectively” people are better off the less they feel guilty for not recycling, the less they think to be able to recycle and the less they see recycling as beneficial which negatively relates with influences recycling behaviour. On the other hand, the more people position themselves as economically better off relative to others (i.e., subjective socio-economic status) the more they feel able to recycle which positively relates with influences recycling behaviour. These rather intuitively contradictory contradicting relationships between objective socio-economic status and perceived behavioural control; and between subjective socio-economic status and perceived behavioural control which have opposite effects on recycling behavior were surprising and not necessarily expected. Likewise, Study 2 reproduced these opposite effects of objective and subjective socio-economic

status, in that first the less our participants reported to be objectively economically better off (i.e., contextualist lower-class individuals) the less they perceive climate change as a threat; whereas the less participants reported to be subjectively economically better off (i.e., contextualist lower-class individuals) the more they perceive climate change as a threat; and secondly the less our participants reported to be subjectively economically better off (i.e., contextualist lower-class individuals) the more they attributed the responsibility for climate change internally. These results suggest that socio-economic status does indeed relates with influence how people appraise climate change and pro-environmentally behave; however, it matters whether people's objective or subjective status is considered. More specifically, our results suggest that "objective" contextualist lower-class individuals perceive climate change neither as a threat nor do they act pro-environmentally; whereas "subjective" contextualist lower-class individuals do not only perceive that they have the ability to act pro-environmentally but they take personal responsibility for climate change which needs to be addressed by everybody (i.e. internal attribution of responsibility). Thus, we partially supported Hypothesis 3 that contextualist lower-class individuals appraise climate change more as a threat to livelihood than solipstic upper-class individuals; but we did not find any empirical support for Hypotheses 4a and 4b that contextualist lower-class individuals tend to attribute climate change rather externally (e.g., outside their group's responsibility) whereby this relationship is mediated by perceived lack of control.

Implications of the Research

Overall, our results have various implications. First, the theory of planned behavior explained slightly more variance of recycling behaviour (38.7%) than recycling intention

(35.9%) in the present study which differs from previous findings that differed regarding the amount of explained variance but not regarding the pattern. For instance, Armitage and Conner (2001) reported on average an explained variance of 39% of recycling intention and 27% of recycling behaviour; while Strydom (2018) explained 46.4% of recycling intention and only 26.4% of recycling behavior in his study. However, the overall trend implied that recycling intentions was better explained by the Theory of Planned Behavior than recycling behavior. In the present study, however, we found that the Theory of Planned Behavior explains slightly better recycling behavior than recycling intention. At this stage, we would rather abstain from any interpretation given that we conducted only one study in this research project that was based on the Theory of Planned Behavior. Future research is necessary to replicate this finding.

Secondly, our findings that instrumental rather than experiential attitudes predict pro-environmental behaviour differed from previous studies because they showed that experiential rather than instrumental attitudes predict pro-environmental behavior (see Tonglet et al., 2004; Davies et al., 2002; Wan et al., 2012). We found these results in both Study 1 and Study 2 which suggests that we are dealing here with a consistent finding. Experiential attitudes refer to an individual affective feeling towards the behaviour; while instrumental attitudes refer to an individual's evaluation of behavioural outcomes (Wan et al., 2017). Our results suggest that not the feelings related to recycling relate with influences actual recycling behavior but rather the perceived consequences to recycle. One could argue that the role of instrumental attitudes – as found in our study – result from the public discourse on recycling in South Africa (e.g., that the South African government stresses the benefits of recycling behavior over the “good” feelings related to recycling behavior) or/and from the concrete circumstances under which the majority of South Africans are living. We would speculate that the latter is the most appropriate

explanation when we take into consideration that 30.4 million South Africans are living below the upper-bound poverty line (STATS SA, 2017). Moreover, our “speculation” corresponds with previous findings that South Africans from low socio-economic households commonly recycle for benefits (STATS SA, 2018). Although, our explanation is still speculative and necessitates further research; our findings, however, suggest that recycling behaviour in developing countries might be informed differently than recycling behaviour in developed countries.

Thirdly, our findings of the extended model of the Theory of Planned Behaviour showed that moral norm and anticipated guilt play an important role in predicting pro-environmental behaviour. These results suggest that people’s beliefs about what is right or wrong might activate feelings of obligation and/or emotions such as guilt to act pro-environmentally. These results provide support for the reasoning that anticipated guilt because of failing to engage in recycling behaviour is relating with influenced by people’s moral obligations to do what is right (Elgaaied, 2012); Rezvani et al., 2017; Onwezen et al., 2013). Moreover, previous studies suggest that subjective norms and moral norms do overlap. For instance, Cialdini, Reno and Kallgren (1990) distinguish between injunctive (what significant others approve or do not approve) and descriptive norms (what is commonly done by others) to enhance the understanding of the influence of socially shared norms on pro-environmental behaviour. On the other hand, moral norms are described as internalized rules prescribing behaviour that is considered as right or wrong. Moreover, Schwartz’s (1977) argument that socially shared norms may be personally adopted and thus become internalized personal moral norms supports the suggestion of overlapping. Therefore, people may not be influenced by external societal pressure but rather by the personal inclination to do what is considered by others to be right. Our findings and the outlined argumentation suggest that socially shared norms play an important role for pro-

environmental behaviour which supports the argumentation of the Social Identity Model of Pro-Environmental Action (Fritsche et al., 2018) that ingroup identification, collective efficacy beliefs, ingroup norms and ingroup goals influence people's intentions to behave pro-environmentally and their actual pro-environmental behaviour.

Fourthly, our findings about the role of socio-economic status on pro-environmental behaviour were contradictory. For instance, our results of Study 1 showed that the more “objectively” people are better off the less they think of being able to recycle which negatively relates with influences their recycling behaviour. On the other hand, the more “subjectively” people position themselves as economically better off the more they feel able to recycle which positively relates with influences their recycling behavior. Our findings contradict previous studies that suggest that recycling was more common among high socio-economic status households than among low socio-economic status households as a result of situational factors such as awareness, access to refuse-removal services, availability of recycling programmes, and availability of space to sort and store waste material for collection on the premises (STATS SA, 2018). The reason for these contradictory contradicting findings might be that we assessed recycling as reusing of items (e.g., I use reusable water bottles”) and as separating of items (e.g., I recycle items rather than throwing them in the trash”), whereas the General Household Survey (2018) on which the study on South Africans' environmental behaviour is based on (STATS SA, 2018), assessed recycling rather as an act of refuse removal from the household.

Moreover, our results of Study 2 showed that “objective” contextualist lower-class individuals do not perceived climate change as a threat; while “subjective” contextualist lower-class individuals do perceive climate change as a threat. Our results, however, also imply that “objective” solipstic high-class individuals do perceive climate change as a threat. One could

argue that these results contradict our reasoning that people who live in low socio-economic environments are more sensitive to climate change threats than people from high socio-economic environments (Manstead, 2018). We would however argue that our results do not necessarily contradict our reasoning. First, we showed that participants who *subjectively* position themselves as lower-class individuals feel indeed threatened by climate change. Secondly, those who objectively position themselves as higher-class individuals also feel threatened by climate change. The origins for the threat might, however, differ. While lower-class individuals might fear to lose the little, they have; higher-class individuals might fear to lose the much, they have. Future research is needed to explore these differences further.

Limitations

As with all researches, our two studies have limitations. Firstly, the correlational design of our two studies does not allow to draw causal conclusions. Secondly, measures were not consistent across the two studies which limits their comparability. For instance, the measurement of objective and subjective socio-economic status differed across the two studies as well as pro-environmental behaviour was measured not only by fewer items but also different items in Study 2. Thirdly, self-report measures used in the studies are eligible for bias. Moreover, some participants from the low economic status context in Study 1 required parts of the questionnaire to be translated as a result of language barrier. However, the questionnaire translation was not standardised.

Conclusion

Irrespective of the outlined limitations, the present research makes valid contributions to the literature on pro-environmental behaviour. First, the present research tested the Theory of Planned Behaviour in the context of developing nations and thus provides empirical evidence that this theory is not only parsimonious but also robust. Secondly, the present research addressed the role of social and economic status not as an outcome of climate change but as a factor that **relate with influences** the appraisal of climate change and the response to climate change (i.e., pro-environmental behaviour). Lastly, the present study is one of the few psychological studies on pro-environmental behaviour that has been conducted outside the WEIRD nations (i.e., western, educated, industrialized, rich and democratic). As Vicente-Molina, Fernandez-Sainz and Izagirre-Olaizola (2013) and Thondhlana and Hlatshwayo (2018) argue that too little research on pro-environmental behaviour is conducted in developing countries. This trend distorts our understanding about pro-environmental behaviour because it is known that populations around the globe differ considerably in that for instance individuals from WEIRD societies are more likely to be individualistic, analytic, concerned with fairness, existentially anxious and less conforming and attentive to context compared to those from non-WEIRD societies (Cotton, Shiel, & Paco, 2016). We would further argue that extending our understanding of pro-environmental behaviour in non-WEIRD societies will not only provide us with insights about the majority of the world population but also might serve to ensure that mistakes of the WEIRD societies that destroy the environment are not repeated.

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APPENDIX 1

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.00 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

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Model : 4
Y : Intentio
X : objectiv
M1 : Attitude
M2 : Attitu_1
M3 : PBC
M4 : Convinie
M5 : MoralNor
M6 : SocialNo
M7 : ProblemA
M8 : Concern
M9 : Internal
```

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Covariates:
subjecti

Sample
Size: 420

OUTCOME VARIABLE:
Attitude

Model Summary	R	R-sq	MSE	F	df1	df2	p
	.1511	.0228	.5871	4.8713	2.0000	417.0000	.0081

Model	coeff	se	t	p	LLCI	ULCI
constant	4.1248	.1055	39.1022	.0000	3.9174	4.3321
objectiv	.0714	.0232	3.0812	.0022	.0258	.1169
subjecti	-.0098	.0224	-.4368	.6625	-.0538	.0342

OUTCOME VARIABLE:
Attitu_1

Model Summary	R	R-sq	MSE	F	df1	df2	p
	.1433	.0205	.5554	4.3691	2.0000	417.0000	.0132

Model	coeff	se	t	p	LLCI	ULCI
constant	4.1339	.1026	40.2907	.0000	3.9322	4.3355
objectiv	.0608	.0225	2.6983	.0073	.0165	.1051

subjecti .0077 .0218 .3531 .7242 -.0351 .0505

OUTCOME VARIABLE:
PBC

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2054	.0422	.6032	9.1828	2.0000	417.0000	.0001

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5452	.1069	33.1560	.0000	3.3350	3.7553
objectiv	-.0934	.0235	-3.9783	.0001	-.1396	-.0473
subjecti	.0613	.0227	2.7007	.0072	.0167	.1059

OUTCOME VARIABLE:
Convinie

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0940	.0088	.9251	1.8568	2.0000	417.0000	.1575

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.2158	.1324	24.2857	.0000	2.9555	3.4760
objectiv	.0415	.0291	1.4276	.1542	-.0156	.0987
subjecti	.0229	.0281	.8132	.4166	-.0324	.0781

OUTCOME VARIABLE:
MoralNor

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1332	.0177	.5033	3.7633	2.0000	417.0000	.0240

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.7183	.0977	38.0702	.0000	3.5264	3.9103
objectiv	.0207	.0215	.9645	.3354	-.0215	.0629
subjecti	.0449	.0207	2.1671	.0308	.0042	.0857

OUTCOME VARIABLE:
SocialNo

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2171	.0471	.9052	10.3144	2.0000	417.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.6978	.1310	28.2302	.0000	3.4403	3.9552
objectiv	-.1293	.0288	-4.4961	.0000	-.1859	-.0728
subjecti	.0541	.0278	1.9469	.0522	-.0005	.1088

OUTCOME VARIABLE:
ProblemA

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1793	.0321	.7447	6.9217	2.0000	417.0000	.0011

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.9217	.1188	33.0090	.0000	3.6882	4.1552
objectiv	.0925	.0261	3.5447	.0004	.0412	.1438
subjecti	.0007	.0252	.0294	.9766	-.0488	.0503

OUTCOME VARIABLE:
Concern

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1591	.0253	.4923	5.4181	2.0000	417.0000	.0048

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.8758	.0966	40.1245	.0000	3.6859	4.0657
objectiv	.0681	.0212	3.2086	.0014	.0264	.1098
subjecti	-.0051	.0205	-.2485	.8039	-.0454	.0352

OUTCOME VARIABLE:
Internal

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1422	.0202	1.1548	4.3056	2.0000	417.0000	.0141

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5566	.1479	24.0404	.0000	3.2658	3.8474
objectiv	-.0850	.0325	-2.6164	.0092	-.1489	-.0211
subjecti	.0642	.0314	2.0445	.0415	.0025	.1259

OUTCOME VARIABLE:
Intentio

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6752	.4559	.3651	31.0840	11.0000	408.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3882	.2398	1.6188	.1063	-.0832	.8596
objectiv	.0367	.0201	1.8258	.0686	-.0028	.0763
Attitude	.0675	.0586	1.1515	.2502	-.0477	.1827
Attitu_1	.1215	.0598	2.0307	.0429	.0039	.2392

PBC	.0891	.0459	1.9404	.0530	-.0012	.1793
Convinie	.0194	.0317	.6113	.5413	-.0429	.0817
MoralNor	.1820	.0599	3.0386	.0025	.0643	.2997
SocialNo	.0822	.0423	1.9460	.0523	-.0008	.1653
ProblemA	.0514	.0471	1.0919	.2755	-.0412	.1440
Concern	.1206	.0610	1.9783	.0486	.0008	.2405
Internal	.1849	.0360	5.1412	.0000	.1142	.2555
subjecti	-.0199	.0180	-1.1068	.2690	-.0552	.0154

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
.0367	.0201	1.8258	.0686	-.0028	.0763

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	-.0049	.0182	-.0405	.0335
Attitude	.0048	.0049	-.0029	.0164
Attitu_1	.0074	.0045	-.0005	.0175
PBC	-.0083	.0056	-.0204	.0016
Convinie	.0008	.0016	-.0018	.0046
MoralNor	.0038	.0044	-.0039	.0135
SocialNo	-.0106	.0074	-.0259	.0027
ProblemA	.0048	.0061	-.0066	.0179
Concern	.0082	.0053	-.0015	.0196
Internal	-.0157	.0072	-.0304	-.0026
(C1)	-.0026	.0076	-.0173	.0135
(C2)	.0131	.0068	.0018	.0282
(C3)	.0040	.0051	-.0044	.0157
(C4)	.0011	.0061	-.0107	.0140
(C5)	.0155	.0085	.0002	.0338
(C6)	.0001	.0082	-.0157	.0171
(C7)	-.0034	.0071	-.0168	.0117
(C8)	.0205	.0080	.0057	.0371
(C9)	.0157	.0068	.0029	.0297
(C10)	.0066	.0048	-.0025	.0168
(C11)	.0036	.0058	-.0085	.0146
(C12)	.0180	.0085	.0021	.0357
(C13)	.0026	.0083	-.0147	.0194
(C14)	-.0008	.0068	-.0151	.0130
(C15)	.0231	.0078	.0078	.0388
(C16)	-.0091	.0057	-.0212	.0012
(C17)	-.0121	.0065	-.0249	.0001
(C18)	.0023	.0100	-.0177	.0224
(C19)	-.0131	.0083	-.0309	.0023
(C20)	-.0165	.0081	-.0333	-.0019
(C21)	.0074	.0086	-.0091	.0252
(C22)	-.0030	.0046	-.0132	.0049
(C23)	.0114	.0077	-.0025	.0269
(C24)	-.0040	.0064	-.0174	.0079
(C25)	-.0074	.0054	-.0191	.0029
(C26)	.0165	.0071	.0036	.0309
(C27)	.0144	.0077	-.0014	.0290
(C28)	-.0010	.0078	-.0157	.0159
(C29)	-.0044	.0065	-.0165	.0095
(C30)	.0195	.0065	.0072	.0328

(C31)	-.0154	.0105	-.0375	.0039
(C32)	-.0188	.0086	-.0367	-.0030
(C33)	.0051	.0100	-.0137	.0258
(C34)	-.0035	.0098	-.0237	.0162
(C35)	.0205	.0096	.0024	.0400
(C36)	.0239	.0080	.0077	.0387

Specific indirect effect contrast definition(s):

(C1)	Attitude	minus	Attitu_1
(C2)	Attitude	minus	PBC
(C3)	Attitude	minus	Convinie
(C4)	Attitude	minus	MoralNor
(C5)	Attitude	minus	SocialNo
(C6)	Attitude	minus	ProblemA
(C7)	Attitude	minus	Concern
(C8)	Attitude	minus	Internal
(C9)	Attitu_1	minus	PBC
(C10)	Attitu_1	minus	Convinie
(C11)	Attitu_1	minus	MoralNor
(C12)	Attitu_1	minus	SocialNo
(C13)	Attitu_1	minus	ProblemA
(C14)	Attitu_1	minus	Concern
(C15)	Attitu_1	minus	Internal
(C16)	PBC	minus	Convinie
(C17)	PBC	minus	MoralNor
(C18)	PBC	minus	SocialNo
(C19)	PBC	minus	ProblemA
(C20)	PBC	minus	Concern
(C21)	PBC	minus	Internal
(C22)	Convinie	minus	MoralNor
(C23)	Convinie	minus	SocialNo
(C24)	Convinie	minus	ProblemA
(C25)	Convinie	minus	Concern
(C26)	Convinie	minus	Internal
(C27)	MoralNor	minus	SocialNo
(C28)	MoralNor	minus	ProblemA
(C29)	MoralNor	minus	Concern
(C30)	MoralNor	minus	Internal
(C31)	SocialNo	minus	ProblemA
(C32)	SocialNo	minus	Concern
(C33)	SocialNo	minus	Internal
(C34)	ProblemA	minus	Concern
(C35)	ProblemA	minus	Internal
(C36)	Concern	minus	Internal

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***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
2000

NOTE: Variables names longer than eight characters can produce incorrect output.

Shorter variable names are recommended.

----- END MATRIX -----

APPENDIX 2

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.00 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

```
Model : 4
Y : PEB
X : objectiv
M1 : Intentio
M2 : Attitude
M3 : Attitu_1
M4 : PBC
M5 : Convinie
M6 : MoralNor
M7 : SocialNo
M8 : ProblemA
M9 : Concern
M10 : Internal
```

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Covariates:
subjecti

Sample
Size: 420

OUTCOME VARIABLE:
Intentio

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0761	.0058	.6529	1.2148	2.0000	417.0000	.2978

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.8545	.1112	34.6506	.0000	3.6358	4.0731
objectiv	.0318	.0244	1.3019	.1937	-.0162	.0798
subjecti	.0102	.0236	.4327	.6654	-.0362	.0566

OUTCOME VARIABLE:
Attitude

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1511	.0228	.5871	4.8713	2.0000	417.0000	.0081

Model

	coeff	se	t	p	LLCI	ULCI
constant	4.1248	.1055	39.1022	.0000	3.9174	4.3321

objectiv	.0714	.0232	3.0812	.0022	.0258	.1169
subjecti	-.0098	.0224	-.4368	.6625	-.0538	.0342

OUTCOME VARIABLE:

Attitu_1

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1433	.0205	.5554	4.3691	2.0000	417.0000	.0132

Model

	coeff	se	t	p	LLCI	ULCI
constant	4.1339	.1026	40.2907	.0000	3.9322	4.3355
objectiv	.0608	.0225	2.6983	.0073	.0165	.1051
subjecti	.0077	.0218	.3531	.7242	-.0351	.0505

OUTCOME VARIABLE:

PBC

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2054	.0422	.6032	9.1828	2.0000	417.0000	.0001

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5452	.1069	33.1560	.0000	3.3350	3.7553
objectiv	-.0934	.0235	-3.9783	.0001	-.1396	-.0473
subjecti	.0613	.0227	2.7007	.0072	.0167	.1059

OUTCOME VARIABLE:

Convinie

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0940	.0088	.9251	1.8568	2.0000	417.0000	.1575

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.2158	.1324	24.2857	.0000	2.9555	3.4760
objectiv	.0415	.0291	1.4276	.1542	-.0156	.0987
subjecti	.0229	.0281	.8132	.4166	-.0324	.0781

OUTCOME VARIABLE:

MoralNor

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1332	.0177	.5033	3.7633	2.0000	417.0000	.0240

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.7183	.0977	38.0702	.0000	3.5264	3.9103
objectiv	.0207	.0215	.9645	.3354	-.0215	.0629

subjecti .0449 .0207 2.1671 .0308 .0042 .0857

OUTCOME VARIABLE:
SocialNo

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2171	.0471	.9052	10.3144	2.0000	417.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.6978	.1310	28.2302	.0000	3.4403	3.9552
objectiv	-.1293	.0288	-4.4961	.0000	-.1859	-.0728
subjecti	.0541	.0278	1.9469	.0522	-.0005	.1088

OUTCOME VARIABLE:
ProblemA

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1793	.0321	.7447	6.9217	2.0000	417.0000	.0011

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.9217	.1188	33.0090	.0000	3.6882	4.1552
objectiv	.0925	.0261	3.5447	.0004	.0412	.1438
subjecti	.0007	.0252	.0294	.9766	-.0488	.0503

OUTCOME VARIABLE:
Concern

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1591	.0253	.4923	5.4181	2.0000	417.0000	.0048

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.8758	.0966	40.1245	.0000	3.6859	4.0657
objectiv	.0681	.0212	3.2086	.0014	.0264	.1098
subjecti	-.0051	.0205	-.2485	.8039	-.0454	.0352

OUTCOME VARIABLE:
Internal

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1422	.0202	1.1548	4.3056	2.0000	417.0000	.0141

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5566	.1479	24.0404	.0000	3.2658	3.8474
objectiv	-.0850	.0325	-2.6164	.0092	-.1489	-.0211
subjecti	.0642	.0314	2.0445	.0415	.0025	.1259

OUTCOME VARIABLE:

PEB

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6272	.3934	.5186	21.9965	12.0000	407.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7495	.2867	2.6144	.0093	.1859	1.3131
objectiv	-.0377	.0241	-1.5665	.1180	-.0850	.0096
Intentio	.1934	.0590	3.2780	.0011	.0774	.3094
Attitude	.1157	.0699	1.6537	.0990	-.0218	.2532
Attitu_1	-.1321	.0717	-1.8433	.0660	-.2730	.0088
PBC	.4320	.0550	7.8603	.0000	.3239	.5400
Convinie	-.0943	.0378	-2.4949	.0130	-.1686	-.0200
MoralNor	.0164	.0722	.2272	.8204	-.1255	.1583
SocialNo	.0764	.0506	1.5098	.1319	-.0231	.1758
ProblemA	.0154	.0562	.2731	.7849	-.0952	.1259
Concern	-.0202	.0730	-.2762	.7826	-.1637	.1234
Internal	.1189	.0442	2.6885	.0075	.0320	.2058
subjecti	.0300	.0214	1.4000	.1623	-.0121	.0721

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
-.0377	.0241	-1.5665	.1180	-.0850	.0096

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	-.0575	.0213	-.0999	-.0163
Intentio	.0062	.0055	-.0031	.0180
Attitude	.0083	.0060	-.0030	.0218
Attitu_1	-.0080	.0049	-.0197	-.0003
PBC	-.0404	.0114	-.0647	-.0198
Convinie	-.0039	.0031	-.0112	.0011
MoralNor	.0003	.0023	-.0037	.0064
SocialNo	-.0099	.0075	-.0257	.0044
ProblemA	.0014	.0057	-.0109	.0120
Concern	-.0014	.0059	-.0127	.0104
Internal	-.0101	.0061	-.0242	-.0010
(C1)	-.0021	.0077	-.0163	.0148
(C2)	.0142	.0083	.0005	.0330
(C3)	.0465	.0111	.0262	.0694
(C4)	.0101	.0065	-.0014	.0237
(C5)	.0058	.0057	-.0040	.0186
(C6)	.0160	.0084	-.0013	.0315
(C7)	.0047	.0078	-.0085	.0215
(C8)	.0075	.0085	-.0076	.0253
(C9)	.0163	.0060	.0055	.0289
(C10)	.0163	.0090	.0008	.0368
(C11)	.0486	.0117	.0273	.0728
(C12)	.0122	.0069	-.0005	.0272
(C13)	.0079	.0068	-.0054	.0227

(C14)	.0181	.0095	-.0008	.0370
(C15)	.0068	.0081	-.0082	.0243
(C16)	.0096	.0085	-.0070	.0266
(C17)	.0184	.0083	.0029	.0355
(C18)	.0323	.0134	.0064	.0601
(C19)	-.0041	.0058	-.0168	.0068
(C20)	-.0084	.0056	-.0214	.0002
(C21)	.0018	.0087	-.0154	.0195
(C22)	-.0095	.0080	-.0258	.0056
(C23)	-.0067	.0079	-.0238	.0076
(C24)	.0021	.0085	-.0147	.0194
(C25)	-.0364	.0117	-.0605	-.0148
(C26)	-.0407	.0113	-.0651	-.0199
(C27)	-.0305	.0137	-.0594	-.0050
(C28)	-.0418	.0130	-.0682	-.0163
(C29)	-.0390	.0125	-.0651	-.0159
(C30)	-.0303	.0107	-.0525	-.0100
(C31)	-.0043	.0038	-.0132	.0017
(C32)	.0060	.0083	-.0091	.0233
(C33)	-.0053	.0065	-.0186	.0077
(C34)	-.0025	.0066	-.0158	.0102
(C35)	.0062	.0071	-.0061	.0221
(C36)	.0102	.0076	-.0043	.0257
(C37)	-.0011	.0063	-.0130	.0124
(C38)	.0017	.0063	-.0110	.0144
(C39)	.0104	.0062	.0004	.0253
(C40)	-.0113	.0100	-.0303	.0090
(C41)	-.0085	.0088	-.0261	.0079
(C42)	.0002	.0100	-.0178	.0213
(C43)	.0028	.0101	-.0177	.0226
(C44)	.0115	.0080	-.0037	.0279
(C45)	.0087	.0084	-.0066	.0272

Specific indirect effect contrast definition(s):

(C1)	Intentio	minus	Attitude
(C2)	Intentio	minus	Attitu_1
(C3)	Intentio	minus	PBC
(C4)	Intentio	minus	Convinie
(C5)	Intentio	minus	MoralNor
(C6)	Intentio	minus	SocialNo
(C7)	Intentio	minus	ProblemA
(C8)	Intentio	minus	Concern
(C9)	Intentio	minus	Internal
(C10)	Attitude	minus	Attitu_1
(C11)	Attitude	minus	PBC
(C12)	Attitude	minus	Convinie
(C13)	Attitude	minus	MoralNor
(C14)	Attitude	minus	SocialNo
(C15)	Attitude	minus	ProblemA
(C16)	Attitude	minus	Concern
(C17)	Attitude	minus	Internal
(C18)	Attitu_1	minus	PBC
(C19)	Attitu_1	minus	Convinie
(C20)	Attitu_1	minus	MoralNor
(C21)	Attitu_1	minus	SocialNo
(C22)	Attitu_1	minus	ProblemA
(C23)	Attitu_1	minus	Concern


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(C24)      Attitu_1  minus  Internal
(C25)      PBC      minus  Convinie
(C26)      PBC      minus  MoralNor
(C27)      PBC      minus  SocialNo
(C28)      PBC      minus  ProblemA
(C29)      PBC      minus  Concern
(C30)      PBC      minus  Internal
(C31)      Convinie minus  MoralNor
(C32)      Convinie minus  SocialNo
(C33)      Convinie minus  ProblemA
(C34)      Convinie minus  Concern
(C35)      Convinie minus  Internal
(C36)      MoralNor minus  SocialNo
(C37)      MoralNor minus  ProblemA
(C38)      MoralNor minus  Concern
(C39)      MoralNor minus  Internal
(C40)      SocialNo minus  ProblemA
(C41)      SocialNo minus  Concern
(C42)      SocialNo minus  Internal
(C43)      ProblemA minus  Concern
(C44)      ProblemA minus  Internal
(C45)      Concern  minus  Internal

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***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
2000

NOTE: Variables names longer than eight characters can produce incorrect
output.
Shorter variable names are recommended.

----- END MATRIX -----

APPENDIX 3

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.00 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
 Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
 Y : Intentio
 X : subjecti
 M1 : Attitude
 M2 : Attitu_1
 M3 : PBC
 M4 : Convinie
 M5 : MoralNor
 M6 : SocialNo
 M7 : ProblemA
 M8 : Concern
 M9 : Internal

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Covariates:
 objectiv

Sample
 Size: 420

OUTCOME VARIABLE:
 Attitude

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.1511	.0228	.5871	4.8713	2.0000	417.0000	.0081

Model							
	coeff	se	t	p	LLCI	ULCI	
constant	4.1248	.1055	39.1022	.0000	3.9174	4.3321	
subjecti	-.0098	.0224	-.4368	.6625	-.0538	.0342	
objectiv	.0714	.0232	3.0812	.0022	.0258	.1169	

OUTCOME VARIABLE:
 Attitu_1

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.1433	.0205	.5554	4.3691	2.0000	417.0000	.0132

Model							
	coeff	se	t	p	LLCI	ULCI	
constant	4.1339	.1026	40.2907	.0000	3.9322	4.3355	
subjecti	.0077	.0218	.3531	.7242	-.0351	.0505	
objectiv	.0608	.0225	2.6983	.0073	.0165	.1051	

OUTCOME VARIABLE:
PBC

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2054	.0422	.6032	9.1828	2.0000	417.0000	.0001

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5452	.1069	33.1560	.0000	3.3350	3.7553
subjecti	.0613	.0227	2.7007	.0072	.0167	.1059
objectiv	-.0934	.0235	-3.9783	.0001	-.1396	-.0473

OUTCOME VARIABLE:
Convinie

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0940	.0088	.9251	1.8568	2.0000	417.0000	.1575

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.2158	.1324	24.2857	.0000	2.9555	3.4760
subjecti	.0229	.0281	.8132	.4166	-.0324	.0781
objectiv	.0415	.0291	1.4276	.1542	-.0156	.0987

OUTCOME VARIABLE:
MoralNor

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1332	.0177	.5033	3.7633	2.0000	417.0000	.0240

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.7183	.0977	38.0702	.0000	3.5264	3.9103
subjecti	.0449	.0207	2.1671	.0308	.0042	.0857
objectiv	.0207	.0215	.9645	.3354	-.0215	.0629

OUTCOME VARIABLE:
SocialNo

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2171	.0471	.9052	10.3144	2.0000	417.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.6978	.1310	28.2302	.0000	3.4403	3.9552
subjecti	.0541	.0278	1.9469	.0522	-.0005	.1088
objectiv	-.1293	.0288	-4.4961	.0000	-.1859	-.0728

 OUTCOME VARIABLE:
 ProblemA

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.1793	.0321	.7447	6.9217	2.0000	417.0000	.0011

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.9217	.1188	33.0090	.0000	3.6882	4.1552
subjecti	.0007	.0252	.0294	.9766	-.0488	.0503
objectiv	.0925	.0261	3.5447	.0004	.0412	.1438

 OUTCOME VARIABLE:
 Concern

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.1591	.0253	.4923	5.4181	2.0000	417.0000	.0048

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.8758	.0966	40.1245	.0000	3.6859	4.0657
subjecti	-.0051	.0205	-.2485	.8039	-.0454	.0352
objectiv	.0681	.0212	3.2086	.0014	.0264	.1098

 OUTCOME VARIABLE:
 Internal

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.1422	.0202	1.1548	4.3056	2.0000	417.0000	.0141

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.5566	.1479	24.0404	.0000	3.2658	3.8474
subjecti	.0642	.0314	2.0445	.0415	.0025	.1259
objectiv	-.0850	.0325	-2.6164	.0092	-.1489	-.0211

 OUTCOME VARIABLE:
 Intentio

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6752	.4559	.3651	31.0840	11.0000	408.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3882	.2398	1.6188	.1063	-.0832	.8596
subjecti	-.0199	.0180	-1.1068	.2690	-.0552	.0154
Attitude	.0675	.0586	1.1515	.2502	-.0477	.1827
Attitu_1	.1215	.0598	2.0307	.0429	.0039	.2392
PBC	.0891	.0459	1.9404	.0530	-.0012	.1793

Convinie	.0194	.0317	.6113	.5413	-.0429	.0817
MoralNor	.1820	.0599	3.0386	.0025	.0643	.2997
SocialNo	.0822	.0423	1.9460	.0523	-.0008	.1653
ProblemA	.0514	.0471	1.0919	.2755	-.0412	.1440
Concern	.1206	.0610	1.9783	.0486	.0008	.2405
Internal	.1849	.0360	5.1412	.0000	.1142	.2555
objectiv	.0367	.0201	1.8258	.0686	-.0028	.0763

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
-.0199	.0180	-1.1068	.2690	-.0552	.0154

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.0301	.0172	-.0029	.0653
Attitude	-.0007	.0023	-.0070	.0029
Attitu_1	.0009	.0033	-.0047	.0091
PBC	.0055	.0042	-.0005	.0156
Convinie	.0004	.0012	-.0015	.0035
MoralNor	.0082	.0051	.0004	.0199
SocialNo	.0044	.0040	-.0013	.0142
ProblemA	.0000	.0021	-.0046	.0048
Concern	-.0006	.0028	-.0069	.0052
Internal	.0119	.0067	.0003	.0267
(C1)	-.0016	.0033	-.0093	.0039
(C2)	-.0061	.0045	-.0169	.0007
(C3)	-.0011	.0026	-.0078	.0028
(C4)	-.0088	.0050	-.0206	-.0009
(C5)	-.0051	.0043	-.0151	.0018
(C6)	-.0007	.0028	-.0071	.0042
(C7)	.0000	.0030	-.0068	.0055
(C8)	-.0125	.0065	-.0269	-.0014
(C9)	-.0045	.0052	-.0154	.0056
(C10)	.0005	.0035	-.0056	.0087
(C11)	-.0072	.0052	-.0178	.0022
(C12)	-.0035	.0045	-.0131	.0053
(C13)	.0009	.0034	-.0054	.0085
(C14)	.0015	.0036	-.0052	.0096
(C15)	-.0109	.0063	-.0242	.0005
(C16)	.0050	.0044	-.0020	.0153
(C17)	-.0027	.0062	-.0153	.0092
(C18)	.0010	.0061	-.0113	.0133
(C19)	.0054	.0046	-.0020	.0158
(C20)	.0061	.0048	-.0022	.0167
(C21)	-.0064	.0076	-.0222	.0074
(C22)	-.0077	.0053	-.0198	.0009
(C23)	-.0040	.0042	-.0137	.0025
(C24)	.0004	.0024	-.0045	.0057
(C25)	.0011	.0031	-.0052	.0082
(C26)	-.0114	.0068	-.0263	.0004
(C27)	.0037	.0062	-.0088	.0170
(C28)	.0081	.0052	-.0007	.0196
(C29)	.0088	.0052	-.0001	.0196
(C30)	-.0037	.0074	-.0194	.0102
(C31)	.0044	.0042	-.0022	.0141

(C32)	.0051	.0044	-.0035	.0144
(C33)	-.0074	.0067	-.0221	.0044
(C34)	.0007	.0030	-.0055	.0069
(C35)	-.0118	.0066	-.0262	-.0008
(C36)	-.0125	.0063	-.0263	-.0015

Specific indirect effect contrast definition(s):

(C1)	Attitude	minus	Attitu_1
(C2)	Attitude	minus	PBC
(C3)	Attitude	minus	Convinie
(C4)	Attitude	minus	MoralNor
(C5)	Attitude	minus	SocialNo
(C6)	Attitude	minus	ProblemA
(C7)	Attitude	minus	Concern
(C8)	Attitude	minus	Internal
(C9)	Attitu_1	minus	PBC
(C10)	Attitu_1	minus	Convinie
(C11)	Attitu_1	minus	MoralNor
(C12)	Attitu_1	minus	SocialNo
(C13)	Attitu_1	minus	ProblemA
(C14)	Attitu_1	minus	Concern
(C15)	Attitu_1	minus	Internal
(C16)	PBC	minus	Convinie
(C17)	PBC	minus	MoralNor
(C18)	PBC	minus	SocialNo
(C19)	PBC	minus	ProblemA
(C20)	PBC	minus	Concern
(C21)	PBC	minus	Internal
(C22)	Convinie	minus	MoralNor
(C23)	Convinie	minus	SocialNo
(C24)	Convinie	minus	ProblemA
(C25)	Convinie	minus	Concern
(C26)	Convinie	minus	Internal
(C27)	MoralNor	minus	SocialNo
(C28)	MoralNor	minus	ProblemA
(C29)	MoralNor	minus	Concern
(C30)	MoralNor	minus	Internal
(C31)	SocialNo	minus	ProblemA
(C32)	SocialNo	minus	Concern
(C33)	SocialNo	minus	Internal
(C34)	ProblemA	minus	Concern
(C35)	ProblemA	minus	Internal
(C36)	Concern	minus	Internal

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***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
2000

NOTE: Variables names longer than eight characters can produce incorrect output.
Shorter variable names are recommended.

----- END MATRIX -----