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Abstract

With evidence suggesting conservation attitudes and moral norms lack discriminant validity, the study's aim was to test if this could be established for recycling, as well as how moral norms can extend the theory of planned behaviour (TPB). A sample of 271 participants that consisted predominantly of students were obtained for this correlational study (117 males and 154 females, M age = 24 years). Since confirmatory factor analysis indicated convergent validity ($r = .69, p < .05$), path analysis was conducted on a model that replaced attitudes with moral norms in the TPB. This model was found to fit the data well, with 39% and 41% of the variance in recycling intention and behaviour explained respectively. Overall, results supported the utility of appealing to moral norms as it was associated with a higher recycling intention ($\beta = .33, 95\% \text{ CI } [.23, .43]$), and ultimately, actual recycling.

Keywords: recycling, theory of planned behaviour, moral norms

A moral basis for recycling: Extending the theory of planned behaviour
Lucy Chan and Brian Bishop

1. Introduction

Lifestyle decisions and consumerism are highlighted as drivers of the problem of anthropogenic climate change (Roy & Pal, 2009), recycling should be promoted since it not only reduces the consumption of natural resources but also energy. By recycling paper in particular, Australian estimates are that 4100kWh of electricity can be saved, along with 13 trees, for each tonne of paper recycled. These trees that are saved can therefore remain as carbon sinks which remove the GHG carbon dioxide from the atmosphere (Clean Up, 2009).

While a national survey on climate change concerns conducted in 2010 revealed that 70% of Australian respondents reported recycling for mainly environmental reasons (Leviston & Walker, 2010), state trends reveal that Western Australia concurrently recycles the least but also generates the most amount of waste per capita (Australian Bureau of Statistics, 2010). Because of the environmental benefits of recycling, there is a need to encourage more Western Australians to recycle. Psychological theories of behavioural change can help inform how this can be achieved.

1.1 Psychological Theories of Behavioural Change

In Psychology, numerous theories have been developed to explain pro-environmental behaviour change. For example, the norm activation model (NAM; Schwartz, 1973) and value-belief-norm (VBN) theory (Stern, 2000) which builds on the NAM both propose the activation of personal norms as a direct determinant of behaviour. These norms, as conceptualised by Schwartz (1973), are characterised by a feeling of moral compulsion to behave in a certain way. However, the two theories that boast the widest support and application are the theory of planned behaviour (TPB), and its precursor, the theory of reasoned action (TRA; Armitage & Conner, 2001).

In the TPB (Ajzen, 1991), behaviour is proposed as being a function of a willingness to perform a behaviour (i.e. intention), and the degree of control that one perceives they have over the behaviour (i.e. perceived behavioural control or PBC). The stronger these are, the more likely the behaviour will be executed. Intention itself is proposed as being a function of not only PBC, but also attitudes and subjective norms. Therefore, the more favourably a behaviour is evaluated and the more social pressure one perceives they should comply with, coupled with a sense of PBC, the stronger behavioural intentions are. This theory has been applied in previous literature to study recycling (e.g. Chen & Tung, 2010).

In comparing theories, previous researchers have concluded that the TPB is the better model for explaining public transport use (Bamberg & Schmidt, 2003) and general conservation behaviour (Kaiser, Hübner, & Bogner, 2005). However, inspection of the latter study's methodology revealed that the scales for PBC and intention yielded Cronbach's alphas lower than .70. The questionable reliability of the measures used therefore compromises statistical conclusion validity so that the relationship exists between the respective variables remains problematic (Busk, 2010). Since its comparison model, the VBN theory, overall had better scale reliabilities, the conclusion that the TPB is the better model is also questionable.

1.2 The (In)Adequacy of the Theory of Planned Behaviour

Despite reservations with single studies, meta-analytic results support the models overall predictive utility, with 39% and 27% of the variance accounted for in intention and behaviour respectively (Armitage & Conner, 2001). However, the theory ultimately models behaviour on rationality and the weighing up of costs and benefits to an action (Manstead, 2000). It therefore ignores intrinsic sources of motivation. Recently, there has been renewed interest in the utility of moral norms, with evidence of a convergence between models like the TPB and theories like the NAM and VBN theory (Turaga, Howarth, & Borsuk, 2010). Indeed, morality is argued to be important because it is believed that the lack of response to mitigation is the result of a failure to perceive climate change as a moral problem, thus failing to stimulate an affective response which would otherwise motivate more people to act (Seabright, 2010).

1.3 Theoretical and Empirical Support for Moral Norms

On a theoretical level, moral norms are considered relevant. Since recycling is costly in time and effort as individuals have to sort, store, and transport their recyclables, even if this is just to the kerbside (Smallbone, 2005), while offering no extrinsic reward, the economic assumption of rationality would argue that no individual would recycle. The behaviour is therefore best conceptualised as a moral rather than an economic behaviour; because the motivation must be derived from an intrinsic source (Thøgersen, 1996). This may be from personal or moral norms which are internalised rules that prescribe what behaviours are considered right or wrong in particular situations (Schwartz, 1977).

Recently, a meta-analysis of the psycho-social determinants of pro-environmental behaviour found empirical support for the utility of including moral norms in a TPB-like framework (Bamberg & Möser, 2007). In this study, 52% of the variance in intention could be accounted for by a combination of attitudes, personal moral norms, and PBC. These

authors argued that pro-environmental behaviours are best conceptualised as behaviours which involve a combination of both self-interested and selfless motives; hence, why they advocate the combination of rational choice theories with those that are more pro-socially motivated.

1.4 Morally Extending the Theory of Planned Behaviour

In addition to the arguments presented thus far, interest in the inclusion of moral norms as an additional predictor in the TPB deserves further attention because of conflicting results as to where the variable best fits within this theoretical framework. In research examining willingness to use public transport, there has been considerable support for moral norm being a predictor of environmentally responsible behaviour (e.g., Bamberg, Hunecke & Blöbaum, 2007; Harland, Staats & Wilke, 2007; Heath & Gifford, 2002). With respect to recycling intention (e.g. Chen & Tung, 2010), there is limited evidence to indicate that moral norms may also serve as a predictor of attitude. For example, Kaiser (2006) examined moral norms as either a predictor of intention, attitude, or a substitute for attitude in the study of general conservation behaviour which included items about recycling. He found that all three models fit the data well according to the fit statistics and a lack of discriminant validity between moral norms and attitudes because the two shared very high correlations (i.e. $r = .94$ and $r = 1.0$). Kaiser concluded that these findings suggest that moral norms may already be represented in people's attitudes towards conservation behaviour, or perhaps that moral norms are a powerful antecedent of conservation attitudes. Chen and Tung (2010) on the other hand were able to find discriminant validity between these constructs in their extension of the TPB on recycling.

Methodological differences between Kaiser (2006) and Chen and Tung's (2010) study may account for the differing results that emerged. Since Kaiser examined a behavioural domain of conservation behaviour, his results may not reflect recycling specifically or particularly well. He does, however, argue that the measures he adopted were more reliable than previous studies since he aggregated and varied the content in the measures he used to circumvent criticisms of common method variance driving the results. However, statistical conclusion validity is again an issue as the Cronbach's alphas for PBC and intention failed to reach .70 in both studies conducted while attitude failed to reach .70 in the second. For Chen and Tung, all measures yielded Cronbach's alphas greater than .80.

It could also be argued that the way in which Chen and Tung (2010) established discriminant validity was rather lax. These authors tested for this by assessing if the correlation between the two constructs was significantly less than 1, and found that their

modest correlation of .51 was. They therefore concluded that the constructs were distinct, despite being correlated. This somewhat contradicts the definition of discriminant or divergent validity which argues that distinct constructs should be unrelated (Gravetter & Forzano, 2006).

Therefore, to test where moral norms may best fit within the TPB framework, specifically for recycling is aimed for in this research. In line with Manstead (2000), it is hypothesised that moral norms and attitudes should exhibit discriminant validity because moral norms reflect an individual's feelings about whether a behaviour is inherently right or wrong. Furthermore, semantic differential attitude scales, as used by the TRA/TPB's authors are said to reflect overall positive or negative evaluations towards a behaviour. According to Manstead, these scales tend to focus more on payoffs rather than inherent rightness or wrongness, where only the item of good/bad is argued to potentially overlap with moral concerns.

If discriminant validity can be demonstrated, the goodness of fit between a model that includes moral norms as another predictor of intention (Model A, Figure 1) will be compared with a model that includes it as a predictor of attitude (Model B, Figure 2). If discriminant validity is not supported, this will indicate that moral norms could replace attitudes in the TPB. Therefore, in this scenario, such a model will be tested instead (Model C, Figure 3). These questions can be answered through a correlational analysis of the proposed relationships which can help inform how Western Australia's recycling trend can be improved.

2. Method

2.1 Research Design

The design was correlational because the models proposed that recycling intention mediated the relationship between the predictors of attitudes, subjective norms, PBC, and moral norms, with the criterion of recycling behaviour. In Model B it was also proposed that attitudes mediated the relationship between moral norms and recycling intention.

2.2 Participants

For path analysis, Kline (2011) has recommended that there be at least 10 cases per parameter estimated. This translated to a minimum sample size of 210; an estimate based on the more complex saturated version of Model A, and considerably more than the minimum

sample size of 95 for multiple regression (Soper, 2011). The final sample size of 271 (117 males and 154 females) satisfied these *a priori* conditions.

Limited identifying information was gathered as part of the anonymity of the procedure. Participants' ages ranged from 18 to 64 ($M = 24$ years, $SD = 7.31$) and was skewed negatively towards younger participants, almost half of the sample were in their early 20s and 85% were 30 or below. The majority identified themselves as being students ($n = 226$). Participants were recruited via online convenience sampling through the Web Survey List website, and Undergraduate Psychology and Microeconomics 200 link on Curtin University's Blackboard website. Flyers were also distributed in computer labs and posted on notice-boards around the campus. Snowball sampling was also employed by having friends and family recruit their own contacts via Facebook. All participants who completed a questionnaire had an opportunity to win one of two online gift vouchers worth \$50 each.

2.3 Measures

Measures for attitudes, subjective norms, PBC, and moral norms were from Tonglet, Philips, and Read (2004). These measures were in a 7-point response scale format with the latter three scales rated from 1 (*strongly disagree*) to 7 (*strongly agree*).

2.3.1 Attitude. Participants rated their responses to six statements about their attitudes towards recycling on a semantic differential scale (e.g. recycling is rewarding/not rewarding). Like the scale's authors, one factor was found. Their Cronbach's alpha was .90. For this study, it was .84.

2.3.2 Subjective norm. Participants rated their level of agreement to two statements about the perception of social pressure to recycle (e.g. most people who are important to me think I should recycle my household waste). The scale's authors found one factor which was replicated in this study. Their Cronbach's alpha was .78. For this study, it was .83.

2.3.3. Perceived behavioural control. Participants rated their level of agreement to seven statements pertaining to how easy they thought recycling was (e.g. recycling my household waste is inconvenient). Support was found for the scale's authors' single factor solution. Their Cronbach's alpha was .88. For this study, it was .75.

2.3.4 Moral norm. The moral norm scale comprised five items where participants rated their level of agreement to statements such as "not recycling goes against my principles". Like Tonglet et al. (2004), one factor was found. Their Cronbach's alpha was .74. For this study, it was .88.

2.3.5 Recycling intention. Engelbrecht's (2008) behavioural intention scale was used where participants rated their willingness to recycle newspaper, glass, plastic, and aluminium in the next month, from 1 (*not willing*) to 7 (*very willing*). Engelbrecht reported a Cronbach's alpha of .94. For this study, one factor was found with a Cronbach's alpha of .91.

2.3.6 Recycling behaviour. Engelbrecht's (2008) household recycling behaviour scale was used where participants reported how often they recycled newspaper, glass, plastic, and aluminium in the previous month as a percentage. A value of 0% indicated that the participant never recycled the item in the previous month while 100% indicated that they always did. For Engelbrecht, a Cronbach's alpha of .90 was found. For this study, one factor was found with a Cronbach's alpha of .82.

2.4 Procedure

An online questionnaire was created using Qualtrics (2011) and set such that all questions needed to be answered to move onto the next page of questions. The link made available directed participants to an information page which contained the link to the questionnaire. After ethics approval from Curtin University's Human Ethics Research Committee was received, the questionnaire was made accessible from early July until mid-August, 2011. After completion, participants could enter a draw to win an online gift voucher by supplying an email address. This information was kept on a separate database to ensure anonymity of the questionnaire responses. Winners were to be selected using an online random number generator (Haahr, 2011) and notified via email.

2.5 Planned Data Analysis

Data was screened and assumptions tested. Using LISREL Jöreskog & Sörbom, (2006), a confirmatory factor analysis (CFA) was conducted to test for discriminant validity between attitudes and moral norms. If a non-significant correlation was found, Models A and B were to be compared using path analysis because it gave fit indexes which could be compared between models. The better model would then subsequently be compared with its saturated version to verify the preference for a mediation model. However, if discriminant validity was not supported, Model C was to be tested and compared with its saturated version in path analysis. For both the CFA and path analyses, the correlation matrices were to be used as input in LISREL.

3. Results

After data was screened and PBC item 3 recoded, a missing values analysis on the initial 296 responses obtained revealed that 5.4% of the data was missing completely at

random for the behaviour items, $\chi^2(59) = 60.34, p = .427$. This was due to 13 cases that had dropped out after completing the attitude scale. These cases and an additional nine that were under the age of 18 were removed from the dataset. Another three cases failed to complete the behaviour measure and so were excluded in the path analyses but retained for the CFA.

Descriptive statistics for the final sample analysed are summarised in Table 1. Since all skewness and kurtosis indexes were less than 3 and 10 respectively, the deviation from normality found was not considered severe (Kline, 2011). It was therefore still deemed appropriate to report the means as a measure of central tendency.

Table 1

Descriptive Statistics for Observed Variables

Variable	<i>M</i>	<i>SD</i>	Range	Skewness	Kurtosis
Attitude	36.68	5.56	6-42	-1.94	5.92
Subjective norm	10.99	2.39	2-14	-1.21	1.73
Perceived behavioural control	35.57	6.87	14-49	-0.63	0.23
Moral norm	25.93	6.22	5-35	-0.60	-0.08
Recycling intention	24.47	4.39	4-28	-2.14	6.51
Recycling behaviour	64.00	28.37	0-100	-0.81	-0.29

3.1 Assumption Testing

Univariate and multivariate outliers were identified. Cook's distances were calculated and Stevens (1992) argues that Cook's distance values greater than one are indicative of influence and corresponding cases should be eliminated from the analysis. In the present study, there were no cases demonstrating Cook scores larger than one. (The outliers varied in Cook's Distances from 0.000 to 0.058). For this reason and the fact that these cases were believed to still be part of the population of interest, they were retained. Since this affected multivariate normality which was subsequently violated ($\chi^2 = 596.589, p < .001$), Spearman's rho was used to compute the correlation matrix for the CFA and path analyses (see Table 2) because this non-parametric measure of association makes no distributional assumptions. This avoids distorting the distribution if there is reason to believe these characteristics are representative of the underlying population (Norman & Streiner, 2008).

Table 2

Spearman's Rho Correlation Matrix for Path Analysis

Variable	1	2	3	4	5	6
1. Attitude	1.00					
2. Subjective norm	.29*	1.00				
3. Perceived behavioural control	.33*	.41*	1.00			
4. Moral norm	.60*	.38*	.33*	1.00		
5. Recycling intention	.41*	.44*	.47*	.50*	1.00	
6. Recycling behaviour	.29*	.36*	.49*	.35*	.59*	1.00

* $p < .001$.

3.2 Hypothesis Testing

In a 2-factor CFA, all attitude and moral norm items were specified to load onto their respective attitude and moral norm factors. This model fit the data well as it met the criteria for good fit along the CFI, NNFI, and SRMR (see Table 3). However, a moderate-to-strong correlation was found between these factors ($r = .69, p < .05$), indicating convergent validity.

Table 3

Goodness-of-Fit Results for the Tests of Discriminant Validity and for Model C

Fit index	2-factor model	Modified 2-factor model	Model C	Goodness of fit criterion ^a
CFI	.97	.98	1.00	$\geq .95$
NNFI	0.96	0.98	1.01	$\geq .95$
SRMR	.05	.03	.01	$< .08$
RMSEA	.10 [.08, .11]	.07 [.04, .09]	.00 [.00, .11]	$< .08$

Note. CFI = comparative fit index; NNFI = non-normed fit index; SRMR = standardised root mean square residual; RMSEA = root mean square error of approximation; [90% confidence interval].

^a Values recommended by Hooper, Coughlan, and Mullen (2008).

To test the possibility that attitude items 1 and 4 (i.e. good/bad and responsible/not responsible) were overlapping with moral norms, the CFA was re-run with these items removed. This modified model, while still exhibiting good fit (see Table 3), did not show a clearer distinction between the two constructs as the correlation between them increased

further ($r = .75, p < .05$). Discriminant validity therefore still could not be established, hence the items were retained. The results for the original CFA are summarised in Figure 5.

3.3 Test of Model C

Since evidence supported convergent validity, Model C was tested where moral norms replaced attitudes in the TPB. The results, also summarised in Table 3 indicate that this model fit the data extremely well as it met the criteria for good fit across all indexes examined. To confirm that this mediation model was preferred over its saturated version which had all direct pathways specified, it was compared to this using a chi-square difference test since the models are nested (Kline, 2011). This was calculated by subtracting the χ^2 obtained from the saturated model (i.e. 0) from the χ^2 obtained from Model C (i.e. 1.39). At the critical χ^2 for $df = 2$ (at $\alpha = .05$) of 5.992, the χ^2_{diff} of 1.39 was statistically non-significant, indicating that Model C was not significantly different from its saturated version. Under these circumstances, the more parsimonious model is preferred; this being Model C.

The indirect effects in Model C were then examined to ensure that the effect of each predictor carried through the mediator of intention to still significantly impact behaviour, rather than losing its effect. Results indicated that the indirect effect of all the predictors on behaviour were significant. For moral norms, its indirect effect on behaviour was .15, $t(269) = 5.07, p < .001$. For subjective norms this was .10, $t(269) = 3.46, p < .001$. For PBC, this was .13, $t(269) = 4.51, p < .001$. These results show that a 1 standard deviation increase in these predictors indirectly increase recycling by between .10 and .15 standard deviations.

Overall, the combination of moral norms, subjective norms, and PBC were able to explain 39% of the variance in recycling intention ($R^2 = .39$), while PBC and intention explained 41% of the variance in recycling behaviour ($R^2 = .41$). These are equivalent to large effect sizes ($f^2 = .64$ and $f^2 = .69$ respectively). The path analytic results obtained for Model C are summarised in Figure 6.

4. Discussion

In the present study, the hypothesis that attitudes and moral norms represent distinct constructs was not supported since they were positively correlated, rather than unrelated. Removing the attitude items of good/bad and responsible/not responsible to address their possible overlap with moral norms did not improve the results. Instead, the correlation between them increased further from .69 to .75. Since this indicated convergent validity,

Model C was tested. It was found that this mediation model that replaced attitudes with moral norms in the TPB fit the data extremely well.

4.1 Discriminant Validity

In failing to find discriminant validity, this may be because using the definition of it as having to involve unrelated factors may be too stringent and unrealistic. Byrne (1998) has argued that negligible correlations are generally unlikely, particularly in psychological data. By using the chi-square difference test employed by Chen and Tung (2010), it may have been found that .69 was significantly different enough from perfect correlation to warrant a conclusion of distinct, but correlated factors. Nevertheless, the correlation found was still lower than those found by Kaiser (2006). This may be because Kaiser's results for general conservation behaviours are not particularly representative of recycling specifically. The .69 correlation would be more consistent with Chen and Tung's .51 found between recycling attitudes and moral norms.

While the correlation suggested convergent validity, we argue that this was not due to similar operationalisations of the constructs. The semantic differential attitude scale reflected overall positive or negative evaluations of recycling which included evaluations of its payoffs. The moral norm scale however pertained to whether participants believed in the moral imperative of recycling and whether they would feel discomfort if they did not recycle. Instead, the constructs may be correlated because, for many people in the study, their moral norms and attitudes were in line with each other. Manstead (2000), who maintained the constructs are distinct, has argued that it is possible for people to simultaneously hold favourable attitudes towards a behaviour, but still feel that it is morally wrong. This therefore implies that it is also not unusual for people to hold attitudes consistent with their moral norms which would explain their positive correlation.

In Kaiser's (2006) study, the explanations he suggested for the convergence he found between moral norms and attitudes were: 1) that the evaluative essence of conservation attitudes is moral, or 2) that moral norms represent a powerful predictor of attitudes. We argue that the first explanation could not apply to this study since it would imply that the semantic differential attitude scale used had a moral overtone. However, since the correlation between moral norms and attitudes increased, rather than decreasing after the removal of the attitude items that had the potential to overlap with moral norms, this indicated that these items were of little relevance to the correlation. Hence, the "evaluative essence" of the attitude scale with these items included could not have been overly moral. As for Kaiser's second explanation, while moral norms as a predictor of attitude was not tested in this present

study, the explanation would imply that moral norms and attitudes do represent distinct, but correlated factors. Considering the arguments thus far presented this latter implication is reasonable.

4.2 Theory of Planned Behaviour

In assuming convergent validity, the test of Model C supported the utility of including moral norms as a predictor of intention. The 39% of the variance explained in intention mirrored the 39% found in Armitage and Conner's (2001) meta-analysis of the standard TPB. This therefore supported the substitutability of attitudes with moral norms for recycling intention. As for the proportion of variance explained in behaviour, the 41% found in this study was higher than the 27% found by Armitage and Conner. This may be due to problems related to the use of self-reports and common method variance that will be discussed later.

The beta coefficients are also similar to those found in Bamberg and Möser's (2007) meta-analysis of the psycho-social determinants of pro-environmental behaviour. For moral norms, PBC, and intention, these authors obtained beta coefficients of .29, .31, and .52 respectively which mirror the values of .33, .28, and .47 found in this present study. Overall, all pathways specified in Model C were significant and in the directions expected by theory. Moral norms, subjective norms, and PBC were associated with higher recycling intentions, which in turn was associated with greater recycling.

However, the intention-behaviour relationship may be challenged since participants in this study were asked to rate their intention to recycle four items and then, immediately after, asked how often they recycled the same four items. This similarity in question content may have been open to the consistency effect; a theory suggesting that participants will try to search for similarities in questions and then try to respond consistently the same way on similar questions (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This relationship may therefore be over-inflated due to common method variance. Despite correlational designs such as the one employed in this study having been criticised because the intention-behaviour relationship may be confounded by a third variable, there is meta-analytic experimental evidence to support a cause-effect relationship (Webb & Sheeran, 2006). While their effect size found was smaller than commonly suggested by correlational studies, this would be expected, given the greater degree of control over error variance in experimental designs. It nevertheless supports the conclusion that an intention-behaviour relationship exists.

Another issue identified is that with a sample comprising an overwhelming majority of students, they may be more prone to social pressures and social desirability responding

(Kaiser, Schultz, Berenguer, Corral-Verdugo, & Tankha, 2008). Since this would restrict the variability of the results and weaken correlations, it can be argued that social desirability responding was not an issue to the extent that it did not lead to non-significant relationships between variables.

Sample self-selection bias is also another problem as those who were more pro-environmental may have been more motivated to participate, leading to an over-representation of these people in the sample (Hage, Söderholm, & Berglund, 2009). In this present study, strong pro-recycling responses were found as all variables exhibited a negative skew. However, this again would most likely have restricted variability, but since all pathways were significant, the potential over-representation of these people is contentious. The sample is obviously not representative of the population as a whole, being young and primarily student, but they can be argued to be part of the population that will be more affected by climate change and for whom changes to pro-environment behaviours is more salient.

4.3 Limitations

Aside from measurement error being unaccounted for in the path analyses which can attenuate relationships, the study is limited due to the potential upward bias in self-reported behaviour (Thøgersen, 1996). This can lead to results that would differ if objective measures had been acquired (Armitage & Conner, 2001). The reliability and validity of the self-reported accounts of the percentage of items recycled in the previous month may therefore be undermined.

Another limitation identified is that the countries in which participants were completing the questionnaire was not recorded. While the majority would have been from Perth, Australia, it is likely that a small number of participants completed the questionnaire overseas due to there being international friends on friends' Facebook lists. Not knowing what countries these participants were from or what their recycling facilities are like may therefore slightly undermine the representativeness and applicability of the results to the Western Australian context. External validity is also hampered by the non-random and student dominated sample that was obtained.

4.4 Future Recommendations

Having identified limitations associated with the present study, future recommendations are to replicate this study with the aforementioned issues taken into account. A more heterogeneous and random sample should be obtained that is more representative of the general population. This should also be restricted to Western

Australians to obtain a clearer picture of these people's psycho-social responses to recycling which will provide clearer policy implications for this region.

By using objective measures of recycling, this could not only improve the reliability and validity of the behaviour measure but also mitigate the problem of common method variance regarding the intention-behaviour relationship. However, objective measures may be difficult to obtain. Podsakoff et al. (2003) offer other alternatives to moderate methodological artefacts. This includes temporally separating the administration of the predictor and criterion measures (i.e. in this case, the intention and behaviour measures) or, among other techniques, counterbalancing the order of presentation of the questions.

Lastly, it is also recommended that this study be replicated with measurement error accounted for and the chi-square difference test used to see if discriminant validity between moral norms and attitudes can be established this way. If this can be achieved then Models A and B should be compared to further verify what role moral norms could play in contributing towards an understanding of recycling.

5. Conclusion

In sum, despite some limitations such as sample specificity, strengths of the present study include that social desirability responding and self-selection bias did not appear to seriously affect the results by restricting variability, and that the intention-behaviour relationship is not spurious because of meta-analytic experimental evidence to support its existence. Overall, support was found for moral norms to replace attitudes in the TPB applied to recycling. Finding that a morally modified model applied well to a mainly young adult student sample, this provides a rationale for harnessing these findings as a way in which younger Western Australia's recycling trend can be improved as one way of reducing GHG emissions. Campaigns could therefore appeal to these young adults' moral imperative to raise their recycling intentions, and ultimately increase their actual recycling. This should be facilitated by increasing these people's sense of perceived behavioural control and subjective norms while challenging their anticipated feelings of guilt (Bamberg et al., 2007).

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