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The effects of attitudinal ambivalence on pro-environmental behavioural intentions

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Abstract

The present article traces the influence of attitudinal ambivalence on the environmentally friendly behavioural intention. Attitudinal ambivalence reflects the simultaneous existence of positive and negative dispositions toward an attitude object. In a survey study of 134 undergraduate students, we tested our hypotheses with multiple regression and mediation analyses. Results reveal that ambivalence is a strong predictor of behavioural intentions. Previous research on environmental attitudes has found inconsistencies with following behaviour. Insofar, the current study defends the view that the scarce predictive power of environmental attitudes may be rooted in deficiencies in the study of their structure.

1. Introduction

Although polls currently show a declining trend in people's environmental concern (e.g. Dunlap, 2002), pro-environmental attitudes have recently been found to be at the highest degree ever recorded (e.g. Dunlap & Scarce, 1991; Scott & Willits, 1994). However, this has not yielded into consistent pro-environmental activity. In other words, existing research shows that the environmental attitude is a scarce predictor of subsequent behaviour. This inconsistency has been explained as being caused by: (a) the use of inadequate measures of the environmental attitude (Weigel, 1983), (b) the lack of measures at the same level of specificity (i.e. the attitude–behaviour inconsistency is reduced when the attitude being measured is more directly related to the action in question (e.g. Ajzen & Fishbein, 1977; Ajzen, 1988; Kraus, 1995; Kaiser, Woelfing, & Fuhrer, 1999), and (c) the little importance acknowledged to situational factors in behavioural prediction (Olli, Grendstad, & Wollebaek, 2001).

Environmental research has conceptualized the environmental attitude as being along an evaluative continuum, based on one or more sources of information (e.g. Maloney & Ward, 1973; Maloney, Ward, & Braucht, 1975), and able to reflect underlying dimensions (e.g. egoistic, altruistic, and bio-spheric; Stern, Dietz, & Kalof, 1993).

Several environmental attitude scales have been suggested to be useful for prediction of subsequent behaviour (e.g. Dunlap & Van Liere, 1978; Stern et al., 1993). More recently, those studies that have proposed environmental attitude measures have improved the predictive value of already existing scales (e.g. Dunlap, Van Liere, Mertig, Catton, & Howell, 1992; Dunlap, Van Liere, Mertig, & Jones, 2000).

However, research on the environmental attitude has typically relied on univalent attitudinal ratings (Dunlap et al., 1992; Olli et al., 2001). We argue that this has contributed to provide an incomplete picture of the interplay between the positive and negative evaluations in the environmental field. For instance, as recently pointed out by Staats (2003), in the theory of planned behaviour (Ajzen, 1985) attitudes are actually defined as a compound of all performance-related positive and negative evaluations multiplied with their respective

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likelihoods of occurrence. Within this framework, thus, a neutral attitude compound score can potentially conceal the existence of two fundamentally diverse subgroups of attitudes towards pro-environmental action: on the one hand, a truly neutral attitude; on the other, an extremely *ambivalent* attitude towards pro-environmental action.

On the basis of these considerations, the present study employs a novel construct to investigate the environmental attitude, that is, "attitudinal ambivalence".

1.1. Attitudinal ambivalence as a predictor of pro-environmental behavioural intentions

Attitude research has recently started to focus on attitudinal ambivalence (see Thompson, Zanna, & Griffin, 1995; Jonas, Broemer, & Diehl, 2000; Conner & Sparks, 2002)—indeed an old-date theoretical construct (Scott, 1966, 1969). Consistent with relevant theoretical work (e.g. Eagly & Chaiken, 1998; Jonas et al., 2000), in this study we refer to *attitudinal ambivalence* as to the simultaneous presence of positive and negative evaluations of the same attitude object. Importantly, as noted earlier, ambivalent attitudes are different from neutral ones: the latter are not associated with evaluative inconsistency but rather are a midway between evaluations of opposite valence.

In the literature, two different approaches to the measurement of ambivalence are available. The first is a *formula-based* measure of ambivalence (Kaplan, 1972), or "objective ambivalence" (Jonas et al., 2000). Specifically, it assumes that a positive or negative evaluation does not necessarily imply an equally strong evaluation of opposite valence. In other words, while an individual may totally agree on a positive attitudinal item, he or she may not totally disagree on the same item of opposite valence. The second approach to measure ambivalence focuses on the *feeling* of being ambivalent, or "subjective ambivalence" (Jonas et al., 2000). Specifically, it assumes that the respondents are aware of their attitudinal ambivalence toward a given object.

The ambivalence construct has been utilized in research on a number of attitude objects, such as various ethnic or social groups (e.g. Katz & Hass, 1988; Glick & Fiske, 1996; Maio, Bell, & Esses, 1996; Jost & Burgess, 2000; Mucchi Faina, Costarelli, & Romoli, 2002; Costarelli & Palmonari, 2003), controversial issues such as capital punishment, abortion or euthanasia (e.g. Thompson & Zanna, 1995; Newby-Clark, McGregor, & Zanna, 2002), consumer behaviour (e.g. Jonas, Diehl, & Broemer, 1997; Otnes, Lowrey, & Shrum, 1997), as well as health-related attitudes and behaviours such as food choice (e.g. Armitage & Conner, 2000; Sparks, Conner, James, Shepherd, & Povey, 2001), drug/alcohol abuse and casual sex (e.g. Conner, Sherlock, & Orbell, 1998; Conner & Flesh, 2001), or smoking (e.g. Lipkus, Green, Feaganes, & Sedikides, 2001).

To our knowledge, the present study is the first to examine the role of attitudinal ambivalence in the domain of environmental concern. Traditionally, research on determinants of the pro-environmental behaviour has focused on either dispositional (e.g. attitudes, values) or situational (e.g. rewards, obstacles) variables. Alternatively, it has investigated the relationships between the former and latter types of variables (e.g. Guagnano, Stern, & Dietz, 1995; Corraliza & Berenguer, 2000; Hunecke, Bloebaum, Matthies, & Hoger, 2001).

Specifically, in order to reduce the spurious impact on the attitude–behaviour relationship of the situationally determined opportunity to act (cf. Fazio, 1990), the current study does not take into consideration behaviour as a dependent variable. By contrast, we focus on the behavioural intention since the latter is less affected by situational factors, relative to the former (Eagly & Chaiken, 1993).

In the attitude structure literature, attitudinal ambivalence has traditionally been treated as an attitude strength measure. Strong attitudes should be more likely to predict behaviour, or behavioural intention, than weak attitudes (e.g. onverse, 1995). Therefore, ambivalent attitudes should be relatively poor predictors of behaviour (see Eagly & Chaiken, 1993). Moreover, previous research has showed that ambivalence leads to higher levels of reasoning on attitude-relevant information (Maio et al., 1996; Jonas et al., 1997). In turn, this makes people hesitate toward action (Haenze, 2001). Besides, previous work on attitude objects other than the environment has showed that ambivalence should have a direct effect on behavioural intention or behaviour (e.g. Thompson & Holmes, 1996; Conner & Flesh, 1998; Walter & Eder-Jonas, 1998; Haenze, 2001).

Thus, ambivalence should be negatively related to strength of pro-environmental behavioural intention: the higher the ambivalence, the lower the strength of environmental concern and, consequently, of pro-environmental behavioural intention.

Measurement of objective ambivalence does not assume that respondents are aware of their degree of ambivalence. Consistent with this view is the notion that this type of measurement may lead respondents "to generate aspects that are not automatically salient when respondents answer items about their experienced ambivalence" (Jonas et al., 2000). Indeed, previous studies have typically found only moderate correlations between objective and subjective ambivalence (e.g. Thompson et al., 1995; Priester & Petty, 1996). Moreover, because of social desirability reasons, in the environmental field people should indeed be inclined to perceive themselves as being less ambivalent (subjective

ambivalence) than they actually are (overall objective ambivalence). As a consequence, being objectively ambivalent should mediate the influence on pro-environmental behavioural intentions exerted by being subjectively ambivalent.

Research in attitude–behaviour models has showed that the evaluative responses based on affective reactions are empirically distinguishable from those based on beliefs (e.g. Abelson, Kinder, Peters, & Fiske, 1982; Crites, Fabrigar, & Petty, 1994; Eagly, Madlinic, & Otto, 1994; Manstead & Parker, 1995; Chaiken, Pomerantz, & Giner-Sorolla, 1995; Trafimow & Sheeran, 1998).

More important, this prior work has shown that these two attitudinal components serve different psychological functions. Specifically, the affective component may serve an adaptive/behavioural function, whereas the cognitive component may serve an information processing/knowledge function (see Breckler & Wiggins, 1989). Moreover, it has been shown that people attach greater validity (e.g. Zajonc, 1980) and greater confidence (Edwards & Von Hippel, 1995) to their attitudinal emotions, relative to their attitudinal beliefs.

Recently, researchers have also examined affective and cognitive dimensions of attitudinal ambivalence (Thompson et al., 1995). Specifically, ambivalence has been conceptualized in two different ways: (a) as stemming from conflicting evaluations within the dimensions of affect or cognition (simultaneously liking and disliking or, alternatively, approving and disapproving), and (b) as arising from conflicting evaluations between these two dimensions (liking but disapproving or, alternatively, disliking but approving) (Thompson et al., 1995; Lavine, Thomsen, & Borgida, 1998; Mac Donald & Zanna, 1998). In the present research we dealt with the former type of attitudinal ambivalence. Accordingly, we exploratively assessed *within-dimension* affect- and cognition-based ambivalence.

At the same time, ambivalence research has also shown that behaviour is more related to affective, rather than cognitive, ambivalence (Lavine et al., 1998; Lipkus et al., 2001).

Based on this reasoning, we predicted that:

- All ambivalence indices (overall "objective" ambivalence, "cognitive", "affective" and "subjective") would be negatively correlated with pro-environmental behavioural intentions (*Hypothesis* 1).
- Overall objective ambivalence would mediate the effects exerted by subjective ambivalence on overall pro-environmental behavioural intention (*Hypothesis* 2).
- Affective ambivalence would mediate the effects exerted by cognitive ambivalence on overall pro-environmental behavioural intention (*Hypothesis* 3).

2. Method

2.1. Participants

One hundred and thirty-four undergraduate students (67 women and 67 men, mean age = 22.9, S.D. = 2.25) from the University of Trento, Italy, voluntarily completed a questionnaire.

2.2. Measures

Objective attitudinal ambivalence. Following Kaplan (1972), we split each of a series of (bipolar) semantic differential scales (Osgood, Suci, & Tannenbaum, 1957) into two unipolar items. One item assessed the degree to which participants endorsed the positive pole of the bipolar scale (e.g. "I feel that recycling gives satisfaction"), whereas another item measured the endorsement of the negative pole (e.g. "I feel that recycling does not give satisfaction"). This method allowed us to measure separate ranking of positivity and negativity and, thus, to calculate ambivalent attitude scores. Among the various existing indices (for a comparative review, see Breckler, 1994; Thompson et al., 1995; Priester & Petty, 1996, 2001), we used Griffin's formulation to calculate ambivalence (Thompson et al., 1995). Accordingly, first, we calculated the mean of the separate scores of the positive and negative evaluations (the attitude "intensity"), and then we subtracted the absolute difference between the two (the attitude "similarity"):

$$\textit{Ambivalence} = [(\text{positive evaluat.} + \text{negative evaluat.})/2 - (|\text{positive evaluat.} - \text{negative evaluat.}|)].$$

This formula produces a score that is a function of the simultaneous intensity of the positive and negative ratings. Accordingly, we calculated objective ambivalence by averaging the positive and negative attitude scores (both expressed by positive values) and subtracting the absolute difference between the two components from the average of the two components, using the formula $(P+N)/2-|P-N|+1.5$, where P is the positive attitude score, and N the negative attitude score. These calculations were performed for each attitude domain (cognition-based and affect-based).

In order to calculate attitudinal ambivalence, on 6-point rating scales (*not at all* = 0, *extremely* = 5), twelve items adapted from a previous study (Van Liere & Dunlap, 1981) were used to measure separately environment-related evaluations of opposite valence. Participants were administered items assessing both their ambivalence on the cognitive attitudinal component (e.g. "I think that enforcing more strongly anti-pollution laws is a wrong choice" vs. "I think that enforcing more strongly anti-pollution laws is a right choice"), and their ambivalence on the affective attitudinal component

("I feel that avoiding to buy polluting products is a wise choice" vs. "I feel that avoiding to buy polluting products is a silly choice").

Subjective attitudinal ambivalence. On 6-point rating scales (*not at all characteristic of my attitude* = 0, *extremely characteristic of my attitude* = 5), two items were used to assess subjective ambivalence. Participants were requested to indicate whether the following statements characterized their attitudes: "I have mixed reactions toward recycling, I'm favourable and unfavourable, all at the same time", and "Concerning antipollution measures, I'm both for and against".

Behavioural intention. On 6-point rating scales (*not at all* = 0, *extremely* = 5), participants completed a series of ten items designed to assess the amount of intentions to behave in an environmentally friendly way.

3. Results

First, we submitted to two separate exploratory Factor analyses the positive and negative univalent items (Oblimin rotation with $\delta = 0$, $r = .31$ and $-.36$, respectively) to check whether they clustered on two different factors of conceptual interest (i.e. "affective" and "cognitive"). On both valence dimensions, participants clearly identified the items as intended (see Table 1a and b) (on positive valence the first factor accounted for 36% of the variance, and the second for 12%; on negative valence the first factor accounted for 36% of the variance, and the second for 14%).

Subsequently, we checked the statistical reliability of the resulting subscales by calculating Cronbach's Alpha coefficients. The four univalent attitude scales (positive and negative affective items; positive and negative cognitive items) yielded satisfactory Alpha coefficients (between $\alpha = .67$ and .72). The twelve univalent items were used to measure affective and cognitive objective ambivalence as well as overall objective ambivalence—a composite index ($\alpha = .63$) we calculated by averaging participants scores on the affective and cognitive ambivalence indices (univalent positive $\alpha = .74$; univalent negative $\alpha = .75$). For the two items used to measure subjective ambivalence, the Alpha coefficient was $\alpha = .69$.

Then, we conducted a preliminary Principal-component analysis (Quartimax rotation) to check whether the 10 items used to measure behavioural intention indeed clustered into some dimensions. This analysis yielded a three-factor solution, which accounted for 66% of the variance in respondents' ratings. The first factor accounted for 42% of the variance, the second for 13%, and the third for 11%. Only items with factor loadings higher than .40 were considered.

This analysis enabled us to construct four indices: a composite score of the ten items used to measure overall pro-environmental behaviour ($\alpha = .84$), a factor-based score of those items concerning the intention to reduce

Table 1
Exploratory factor analysis results (Oblimin rotation)

	Affective	Cognitive	Initial commonalties	Extraction commonalties
(a) *Univalent positive items*				
I think that shutting down an industry, that cannot control its pollution, is a useful choice, even if it would cause more unemployment		.69	.24	.49
I think necessary choice that every one, in its little, reduces urgently the daily waste (energy, water, etc.)		.61	.43	.58
I think that enforcing more strongly anti-pollution laws is a right choice		.59	.35	.44
I feel that avoiding to buy polluting products is a wise choice	.56		.27	.33
I feel that recycling gives satisfaction	.64		.32	.42
I feel that reducing heating system use is a good choice	.80		.43	.68
(b) *Univalent negative items*				
I feel that recycling don't give satisfaction	.76		.47	.58
I feel that reducing heating system use is a bad choice	.86		.46	.76
I feel that avoiding to buy polluting products is a silly choice	.47		.25	.32
I think that enforcing more strongly anti-pollution laws is a wrong choice		.64	.30	.42
I think unnecessary choice that people reduce urgently, in their little, the daily waste (energy, water, etc.)		.65	.31	.44
I think that hooting down an industry that cannot control its pollution it's a useless choice, if subsequently it would cause more unemployment		.64	.24	.43

Note: Only factor loadings of .40 or greater are listed.

Table 2
Correlation matrix

	Subjective ambivalence	Cognitive ambivalence	Affective ambivalence	Total intention	Reduce intention	Consumer intention
Cognitive ambivalence	.265**					
Affective ambivalence	.415**	.357**				
Total intention	−.249**	−.267**	−.377**			
Waste reduce intention	−.326**	−.243**	−.529**	.774**		
Consumer intention	−.148	−.235**	−.288**	.796**	.540**	
Pay intention	−.139	−.159	−.134	.779**	.381**	.355**

Note: $N = 133$; $^{**}p < 0.01$.

Table 3
Regression analyses of behavioural intentions on ambivalence variables

	Step 1		Step 2		Step 3		Step 4[a]	
	R^2	β	R^2	β	R^2	β	R^2	β
Total intention								
Subjective	.062**	−.249**		−.193*		−.090		−.047
Cognitive			.106*	−.217*		−.152		−.153
Affective					.174**	−.293**		−.329***
Waste reduce intention								
Subjective	.106***	−.326***			−.281**	−.120		−.097
Cognitive			.133*	−.171*		−.069		−.073
Affective					.299***	−.459***		−.482***
Consumer intention								
Subjective	022	−.148		−.094		−.012		.000
Cognitive			.064*	−.211*		−.159		−.156
Affective					.106*	−.233*		−.249**
Pay intention								
Subjective	.019	−.139		−.105		−.082		−.023
Cognitive			.036	−.132		−.119		−.120
Affective					.039	−.061		−.100
Affective × subjective							.095*	−.228*

Note: N=134; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.
[a]At step 4 all two-way interactions were entered, but only significant interaction effects are reported.

the waste of natural resources, or "waste reduce intention" ($\alpha = .80$), a factor-based score of those items regarding the intention to consume in an environmentally friendly way, or "consumer intention" ($\alpha = .86$), and a factor-based score of those items concerning the intention to donate money for environment protection, or "pay intention" ($\alpha = .77$).

Correlation analyses. In line with predictions, inspection of the zero-order correlation matrix between the variables of interest (see Table 2) showed that all measures of ambivalence were negatively related with behavioural intention, except for the pay intention.[1] This indicates that greater ambivalence is associated with weaker intention to perform pro-environmental actions.

Multiple regression analyses. We examined the relative power of the ambivalence measures to predict both overall behavioural intention and the three identified sub-dimensions of behavioural intention. Hierarchical regression analyses using the subjective, cognitive, and affective ambivalence indices were performed to predict each of the four behavioural intention measures (see Table 3). We used mean-centred scores to minimize problems of multicollinearity (cf. Aiken & West, 1991). The initial set of analyses predicted behavioural intentions from subjective ambivalence (Step 1), then we inserted cognitive ambivalence (Step 2), and affective ambivalence (Step 3). Finally, the two-way interactions

[1]Additionally, consumer intention and subjective ambivalence did not correlate either ($r = -.14$, n.s.). The ambivalence measures were positively related with one another (all p's $< .01$).

were entered (Step 4), followed by the three-way interactions (Step 5). Because no three-way interactions were statistically significant, Step 5 is not reported in Table 3.

Regarding overall intention, F (3, 129) = 9.03, $p < .0001$, $R^2 = .17$, affective ambivalence was the only significant predictor, $\beta = -.29$, $t = -3.24$, $p < .001$. No interaction effects were significant.

Concerning the waste reduction intention, F (3, 129) = 18.30, $p < .0001$, $R^2 = .30$, affective ambivalence was the only significant predictor, $\beta = -.46$, $t = -5.5$, $p < .0001$. No interaction effects were significant.

Regarding the consumer intention, F (3, 129) = 5.11, $p < .002$, $R^2 = .11$, affective ambivalence was the only significant predictor, $\beta = -.23$, $t = -2.48$, $p < .01$. No interaction effects were significant.

Concerning the pay intention, F (3, 128) = 1.71, $p = .168$, n.s., no predictor variables were significant. However, inclusion of the interaction terms yielded a significant interaction effect between affective and subjective ambivalence, $\beta = -.23$, $t = -2.43$, $p < .02$, F (6, 125) = 2.26, $p < .05$, $R^2 = .09$. Following examination of simple-regression effects by performing a median split (low[er] subjective ambivalence = 0.50; high[er] subjective ambivalence = 2.5, F (1, 132) = 327.43, $p < .0001$) revealed the nature of this effect. Specifically, affective ambivalence was able to explain the variance in the pay intention only among the high-subjective ambivalence participants, F (1, 63) = 6.52, $p < .01$, but not among the low-subjective ambivalence participants, F (1, 65) = 0.46, $p = .49$, n.s.

Mediation analyses. Following Baron and Kenny (1986), we tested the mediation effect of (a) objective ambivalence on the subjective ambivalence–overall intention relationship (see Table 4), and (b) of affective ambivalence on the cognitive ambivalence–overall intention relationship (see Table 5).

In the first mediational analysis we conducted, first, we regressed total intention on subjective ambivalence. Then, we regressed objective ambivalence on subjective ambivalence. Finally, we regressed total intention on both objective ambivalence and subjective ambivalence. As would be expected if there is mediation, the effects of subjective ambivalence on total intention ($\beta = -.25$, $t(133) = -2.95$, $p < .01$), and of subjective ambivalence on objective ambivalence ($\beta = .43$, $t(133) = 5.40$, $p < .001$) were significant in the first two regression equations, and the effect of objective ambivalence was significant in the third regression equation, $\beta = -.36$, $t(133) = -4.12$, $p < .001$, R^2 change = .11, F (1, 132) = 16.95, $p < .001$. Indeed, the effect of subjective ambivalence on total intention was not significant in the third regression equation ($\beta = -.10$, $t(133) = -1.06$, $p > .1$, n.s.), where the effect of objective ambivalence was controlled for by entering it simultaneously in the regression model as a predictor.

Thus, as expected, this analysis showed that objective ambivalence mediates the effect of subjective ambivalence on overall intention. However, this effect was found only on the waste reduction intention subdimension (see Table 4).

In the second mediational analysis we conducted, first, we regressed total intention on cognitive ambivalence. Then, we regressed affective ambivalence on cognitive ambivalence. Finally, we regressed total intention on both cognitive ambivalence and affective ambivalence. As would be expected if there is mediation, the effects of both cognitive ambivalence on total intention ($\beta = -.27$, $t(133) = -3.17$, $p < .01$), and of cognitive ambivalence on affective ambivalence ($\beta = .32$, $t(133) = 3.85$, $p < .001$) were significant in the first two regression equations, and the effect of affective ambivalence was significant in the third regression equation, ($\beta = -.33$, $t(133) = -3.85$, $p < .001$, R^2 change = .09, F (1, 132) = 14.84, $p < .001$). Indeed, the effect of cognitive ambivalence on total intention was not significant in the third regression equation ($\beta = -.16$, $t(133) = -1.95$, $p > .05$, n.s.), where the effect of affective ambivalence was controlled for by entering it simultaneously in the regression model as a predictor.

Table 4
Standardized regression coefficients testing the hypothesis that overall objective ambivalence mediates subjective ambivalence and behavioural intention

Outcome measure:	Total intention			Objective ambivalence	
	β	p		β	p
Total intention					
(1) Subjective ambivalence	−.249	<.004	(2)	.428	<.0001
(3) Subjective ambivalence	−.096	n.s.			
Objective ambivalence	−.363	<.0001			
Waste reduction intention					
(1) Subjective ambivalence	−.326	<.005	(2)	.428	<.0001
(3) Subjective ambivalence	−.143	n.s.			
Objective ambivalence	−.435	<.0001			

Table 5
Standardized regression coefficients testing the hypothesis that affective objective ambivalence mediates cognitive objective ambivalence and behavioural intention

Outcome measure:	Total intention			Affective ambivalence	
	β	p		β	p
Total intention					
(1) Cognitive ambivalence	−.267	<.002	(2)	.318	<.0001
(3) Cognitive ambivalence	−.165	n.s.			
Affective ambivalence	−.326	<.0001			
Waste reduction intention					
(1) Cognitive ambivalence	−.243	<.005	(2)	.318	<.0001
(3) Cognitive ambivalence	−.086	n.s.			
Affective ambivalence	−.502	<.0001			
Consumer intention					
(1) Cognitive ambivalence	−.235	<.006	(2)	.318	<.0001
(3) Cognitive ambivalence	−.161	n.s.			
Affective ambivalence	−.237	<.007			

Thus, as hypothesized, this analysis showed that affective objective ambivalence mediates the effect of cognitive objective ambivalence on overall intention. Following analyses revealed this mediation effect only for the waste reduction intention and the consumer intention subdimensions of overall intention (see Table 5).

4. Discussion

The present study was aimed at investigating the effects of "objective" and "subjective" ambivalence (Jonas et al., 2000) on the behavioural intention to act in pro-environmental ways.

Consistent with previous evidence (e.g. Thompson & Holmes, 1996; Conner & Flesh, 1998; Walter & Eder-Jonas, 1998; Haenze, 2001), the current study has shown that ambivalence can influence behavioural intentions. Specifically, as predicted, we found ambivalence to be negatively correlated with the intention to adopt pro-environmental practices. The more ambivalent the attitudes toward the environment, the lower the pro-environmental behavioural intention. This may depend on the fact that, in the environmental field, holding an ambivalent attitude reflects being not completely convinced of the necessity of environmental safeguard, and hence the low intention to act in a pro-environmental way. This is consistent with the notion that negative attitudes play a more powerful role on formation of attitudinal ambivalence, compared with positive attitudes (Cacioppo, Gardner, & Berntson, 1997).

Besides, in line with the findings of previous research (e.g. Thompson et al., 1995), we found objective ambivalence and subjective ambivalence to be positively correlated. This suggests that both objectively and subjectively ambivalent people are likely to have a low behavioural intention to act in an environmentally friendly way. Therefore, ambivalence in the environmental field could be considered the most anti-environmental attitudinal structure.

However, sub-dimension analyses showed that ambivalence is associated with the waste reduction and consumer intention subdimensions, but not with the pay intention. This may be explained by the fact that the pay intention is more influenced by situational variables (e.g. having money) than it is influenced by dispositional variables, such as being ambivalent.[2]

Additionally, as predicted, affective ambivalence was able to mediate the effects of cognitive ambivalence on overall intention. However, subsequent analyses showed that this mediation effect concerned only the waste reduction and the consumer intention subdimensions. Also in line with predictions, we found that objective ambivalence was capable of mediating the influence of subjective ambivalence on overall behavioural intention. However, following subdimension analyses revealed that this mediation effect concerned only the waste reduction intention. This may be explained by the fact that our participants perceived waste reduction as a more ego-involving practice, relative to the other two

[2]We also found that affective objective ambivalence was able to predict the pay intention only for high-subjective ambivalence participants. In other words, people are likely to be unwilling to pay if, in addition to holding high affective objective ambivalence, they also feel to be ambivalent (high subjective ambivalence). This may explain why we found high-subjective ambivalence participants to be more unwilling to financially contribute to environmental safeguard, relative to low-subjective ambivalence participants—an action not very predictable by one's own attitude, except when the latter is strongly characterized in a negative way by one's being both objectively and subjectively ambivalent.

intention subdimensions. Hence the stronger influence of subjective ambivalence on the former rather than the latter intention subdimension. We believe that it was because of social desirability reasons that subjective ambivalence was able to explain less the behavioural intention than objective affective ambivalence did. People are inclined to perceive themselves as less ambivalent than that they (objectively) are in reality. This may explain why the objective ambivalence index was capable of mediating the subjective ambivalence–overall behavioural intention relationship.

This article has provided some initial evidence regarding the predictive value of attitude, intended as ambivalent, on behavioural intention. More important, we have shown that such a conceptualization and operationalization of attitudes as a bidimensional construct by separating underlying positive and negative dimensions can prove to be useful also in the environmental field. On the applied level, these results seem to point at the necessity to orient environmental policies toward the aim of lowering people's objective ambivalence in the affective component of pro-environmental attitudes, thereby reducing the negativity of their affective univalent evaluation.

Limitations of the study and indications for future research. The most significant limitation of the current study is the absence of behavioural measures. However, a number of so-called "expectancy-value" attitude models assume that behavioural intention is the closest determinant of behaviour (e.g. Ajzen & Fishbein, 1980; Eagly & Chaiken, 1993). Moreover, several environmental studies have found not only statistically significant relationships between intention and behaviour (e.g. Jones, 1990; Goldenhaur & Connell, 1993), but also that the very same environmental attitude measure is able to predict both intention and behaviour (e.g. Fox-Cardamone, Hinkle, & Hogue, 2000).

A further limitation of the present study concerns the sample. Specifically, the strongly negative characterization of ambivalence we found may have depended on the fact that our participants were characterized by an accentuated positivity toward environmental safeguard. The study was conducted with an undergraduate sample, a social category with socio-demographic characteristics that are generally associated with high levels of environmental concern. Specifically, previous research has indicated that pro-environmental attitudes correlate positively with level of education, and negatively with age (e.g. Scott & Willits, 1994). Therefore, further research is needed to assess the applicability of our findings to more heterogeneous samples.

To conclude, to our knowledge, the current study is the first to have employed the ambivalence construct to investigate pro-environmental attitudes. Our main purpose was to propose an alternative approach to the study of both pro-environmental attitude structure and the relationship between such a structure and following pro-environmental behaviour. The present study produced potentially important data for understanding how conceptualizing the environmental attitude as ambivalent may usefully contribute to our understanding of behavioural intentions. However, given the rather limited sample size, it remains an empirically unresolved issue whether attitudinal ambivalence has as much predictive value as the classical univalent attitude measures, and particularly whether it has additional surplus explanatory power over and above classical attitude measures/models. In fact, it may be interesting to pit against each other the relative predictive power of ambivalent and univalent measures on behavioural intention. To this end, the NEP2 scale (Dunlap et al., 1992, 2000), for example, in addition to being an advanced univalent attitude measure, can be easily adaptable to the measurement of ambivalent attitudes.

The ambivalence construct can open new and useful research lines in the study of pro-environmental attitude and behaviour. For instance, future research could either focus on attitudinal ambivalence toward specific environmental issues, or re-conceptualize, in light of the ambivalent measurement, those "expectancy-value" models based on univalent attitude measures which have often been used in the past to explain pro-environmental behaviour (e.g. Fishbein & Ajzen, 1975; Ajzen, 1985).

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