

General Beliefs and the Theory of Planned Behavior: The Role of Environmental Concerns in the TPB

JUDITH DE GROOT¹ AND LINDA STEG

Experimental and Work Psychology

University of Groningen

This study tested whether the theory of planned behavior (TPB; Ajzen, 1985) could explain people's intention to use a park-and-ride facility (transferium) in Groningen, The Netherlands. We extended the TPB by including egoistic, altruistic, and biospheric concerns. A questionnaire study was conducted among 218 respondents who regularly visit the center of Groningen for work or shopping. Environmental concerns were directly related to attitudes toward using the transferium. However, the 3 types of concerns were not directly related to intention to use the transferium. Furthermore, positive attitudes, positive subjective norms, and high perceived behavioral control toward the use of the transferium were related to stronger intention to use the transferium. Limitations and practical implications of the study are discussed.

The continuing growth of car traffic threatens the environment and urban quality of life. More and more cities are experiencing congestion and parking problems. A possible solution to improve accessibility, environmental quality, urban quality of life, and traffic safety in urban agglomerations is the construction of so-called *transferia*; that is, parking facilities, mostly situated along through roads, where quick transfers can be made to public transportation (Ministry of Transport, Public Works, and Water Management, 2001). The municipality of Groningen, a city in the north of The Netherlands, is planning a transferium near a busy motorway close to the city center. Before working out plans in detail, local authorities wanted to know what motivations underlie intention to use this new transferium of potential users. This information would be used to promote the use of the transferium. The present paper reports results of a study aimed to examine factors influencing the extent to which car users intend to use this transferium.

A popular social psychological theory for explaining behavioral choices, such as the choice to use the transferium, is the theory of planned behavior (TPB; Ajzen, 1985, 1991; Ajzen & Madden, 1986). This theory assumes that

¹Correspondence concerning this article should be addressed to Judith de Groot, Experimental and Work Psychology, University of Groningen, Grote Kruisstraat 2/1, 9712 TS, Groningen, The Netherlands. E-mail: J.I.M.de.Groot@rug.nl

behavioral intention is the primary antecedent of behavior. Behavioral intention indicates how hard people are willing to perform the behavior.

According to the TPB, three factors determine behavioral intention. The first factor is *attitudes* toward the behavior, which reflect the overall evaluation of performing the behavior by the individual. Attitudes are based on expectancy beliefs about the likelihood that behavior will result in particular consequences, and on evaluations of the desirability of those consequences (Ajzen & Fishbein, 1980). The second determinant, *subjective norms*, refers to perceived social pressure to engage in the behavior. Subjective norms are based on perceptions of expectations of relevant reference groups concerning the behavior and the motivation to comply with these reference groups. The third determinant, *perceived behavioral control* (PBC), refers to a person's belief as to how easy or difficult it would be to perform the behavior. This determinant is dependent on control beliefs.

The TPB has been successfully applied in predicting a diversity of road user behaviors, such as drinking and driving (e.g., Armitage, Norman, & Conner, 2002; Forward, 1997; Marcil, Bergeron, & Audet, 2001; Parker, Manstead, Stradling, Reason, & Baxter, 1992), speeding (Forward, 1997; Parker et al., 1992), dangerous passing (Forward, 1997; Parker et al., 1992), pedestrian violations of regulations (Moyano Díaz, 2002), and poor lane discipline (e.g., passing on the right; Parker, Manstead, & Stradling, 1995). In the area of travel mode choice, there is also support for the TPB (e.g., Bamberg & Schmidt, 1993, 2001, 2003; Harland, Staats, & Wilke, 1999; Heath & Gifford, 2002; Verplanken, Aarts, Van Knippenberg, & Moonen, 1998). Most studies on travel mode choice have extended the TPB, for example in the area of habits (Bamberg & Schmidt, 1993, 2003; Verplanken et al., 1998), descriptive norms (Heath & Gifford, 2002), and role beliefs (Bamberg & Schmidt, 2003). These constructs have all increased the explanatory power of the model. Personal norms explained extra variance when explaining intention to use other transportation modes instead of a car in a representative sample of the Dutch population (Harland et al., 1999), but not when explaining students' car use (Bamberg & Schmidt, 2003).

The relative importance of attitudes, subjective norms, and PBC seems to differ for different target behaviors (e.g., car use, bus use), as well as different target groups (e.g., groups differing in travel purpose, sex, or travel frequency). These differences imply that no general conclusion can be drawn on the most significant predictors of travel behavior; that is, travel mode choice.

Another line of research focuses on relationships between environmental behavior (e.g., travel mode choice) and general environmental beliefs (e.g., Gärling, Fujii, Gärling, & Jakobsson, 2003; Kaiser, Wöfling, & Fuhrer, 1999; Nordlund & Garvill, 2002; Schultz & Zelezny, 1998; Steg & Sievers, 2000). It is important to study relationships between general beliefs and behavior as

well because general beliefs may affect a wide range of behaviors. Therefore, it can provide more insight in variables on which an intervention should best focus, and it can be helpful in defining different target groups. Both may facilitate the promotion of pro-environmental behavior, such as the use of a transferium.

Public transportation use, and, consequently, the use of transferia, is often defined as pro-environmental behavior because it has lower environmental impacts than does car use. Therefore, theoretical frameworks emphasizing the significance of general environmental beliefs in explaining environmental behavior may be used to explain the choice to use the transferium.

There is growing empirical evidence that environmental behavior—and, more specifically, travel mode choice—is related to general determinants, such as value orientations (Cameron, Brown & Chapman, 1998; Eek, Loukopoulos, Fujii, & Gärling, 2002; Hunecke, Blöbaum, Matthies, & Höger, 2001; Joireman, Van Lange, Kuhlman, Van Vugt, & Shelley, 1997; Van Vugt, Meertens, & Van Lange, 1995) or general environmental concerns (Schultz, 2001; Stern & Dietz, 1994). Studies based on the TPB scarcely examined more general behavioral determinants, such as values or general beliefs. Ajzen and Fishbein (1980; Ajzen, 1988; also see Bamberg, 2003) propose that general determinants can have an important indirect effect on behavior via their effect on the perception and evaluation of situation-specific behavioral, normative, and control beliefs and, consequently, on attitudes, subjective norms, and PBC.² It may be assumed that environmental concerns especially affect behavior-specific attitudes, for environmental consequences may be one of the possible behavioral beliefs. This assumption, however, has hardly been tested empirically. Extensions of the TPB have focused mostly on whether various variables (e.g., habits, personal norms) are directly related to travel intentions and behavior (e.g., Harland et al., 1999; Heath & Gifford, 2002; Verplanken et al., 1998).

To the authors' knowledge, only one study has examined relationships between environmental concerns and environmental behavior within a TPB framework (Bamberg, 2003). In a study among 380 university students, environmental concerns appeared to have no significant direct effect on intention to use a "green" electricity brochure, as well as on actual request of such a brochure. However, environmental concerns were significantly related to behavioral beliefs and, to a lesser extent, to control and normative beliefs. Bamberg concluded that environmental concerns probably affect environmental behaviors indirectly via situation-specific beliefs.

²A similar line of reasoning is emphasized in value belief norm (VBN) theory (Stern, 2000). Here, too, it is assumed that general environmental beliefs affect environmental behavior indirectly via behavior-specific beliefs.

In line with Stern and Dietz's (1994) value-basis theory for environmental attitudes, Schultz (2000, 2001) argued that concerns about specific environmental issues may be rooted in awareness of harmful consequences of environmental problems to values or valued objects. Schultz distinguished three clusters of environmental concerns that may affect behavior-specific attitudes and environmental behavior; namely, egoistic, altruistic, and biospheric environmental concerns (see also Dietz, Stern, & Guagnano, 1998; Stern, 2000; Stern & Dietz, 1994; Stern, Dietz, & Kalof, 1993). People with high egoistic concerns will especially consider the costs and benefits of environmental behavior for them personally. When the perceived benefits exceed the perceived costs, they will have an environmentally friendly intention and vice versa. People with high altruistic concerns will base their decision to behave pro-environmentally or not on the perceived costs and benefits of behavior for other people, such as the community, family, or humanity in general. Finally, people having high biospheric concerns will base their decision to act pro-environmentally on the perceived costs and benefits for the ecosystem and biosphere. This distinction was empirically validated in different samples (Schultz, 2000, 2001; Schultz et al., 2005).

Theoretically, all three dimensions of environmental concerns provide a distinct basis for environmental behavior. For instance, a person may reduce car use because the costs are too high (egoistic), because it endangers the health of people (altruistic), or because it harms protected plant and animal species (biospheric). Therefore, people who are concerned about environmental problems because of altruistic or biospheric reasons are not necessarily more ecologically sound than people who are concerned about the environment because it threatens egoistic interests.

To the authors' knowledge, no study has examined the relationships between environmental concerns as defined by Schultz (2000, 2001), behavior-specific beliefs (i.e., attitudes, subjective norms, PBC) from the TPB, and intention. Although Bamberg (2003) studied the relationship between environmental concerns, behavior-specific beliefs, and environmental behavior, he did not distinguish between reasons for being concerned about environmental problems (i.e., egoistic, altruistic, and biospheric concerns). Also, Bamberg's study focused on behavior with few behavioral constraints (i.e., requesting a green electricity brochure). Thus, it is not yet known whether results may be generalized to other behaviors and to behaviors with higher behavioral costs in terms of money, time, and effort.

Using the transferium instead of the car may be perceived as a high-cost behavior because of the strong behavioral constraints associated with this behavior (e.g., Poortinga, Steg, & Vlek, 2004; Steg, Dreijerink, & Abrahamse, 2005). That is, compared to public transportation (and possibly transferia), the car has many personal advantages, such as freedom, comfort,

status, and convenience, which may be evaluated as more important than the environmental consequences associated with car use (Steg, 2003). Furthermore, Bamberg's (2003) study was conducted among a student sample. It may be that these results cannot be generalized to a non-student population. The present study takes these three issues as a starting point.

Some studies have examined relationships between general beliefs, behavior-specific beliefs, and behavioral intentions (e.g., Stern & Dietz, 1994; Stern, Dietz, & Guagnano, 1995; Stern et al., 1993; Stern, Dietz, Kalof, & Guagnano, 1995). However, these studies study environmental behavior within a normative framework instead of a rational choice framework. Normative theories appeared to be less successful in explaining pro-environmental intentions and behaviors associated with high behavioral costs (e.g., travel mode choice) than rational choice theories (Bamberg & Schmidt, 2003; Guagnano, Stern, & Dietz, 1995; Hunecke et al., 2001; Steg et al., 2005). Furthermore, related to this, studies examining relationships between general beliefs, behavior-specific beliefs, and intentions typically have focused on different low-cost behaviors with few behavioral constraints; for example, recycling or signing a petition (Karp, 1996; Stern & Dietz, 1994; Stern, Dietz, & Guagnano, 1995; Stern et al., 1993; Stern, Dietz, Kalof et al., 1995). It is not known whether results may be generalized to intentions and behaviors associated with high costs.

The present study aims to examine relationships between three clusters of environmental concerns (i.e., egoistic, altruistic, and biospheric concerns), attitudes toward using a transferium, and intention to use a transferium. We propose the following:

Hypothesis 1. The three clusters of environmental concerns will be directly related to attitudes toward transferium use.

Hypothesis 2. Environmental concerns will be related to behavioral intention only indirectly, via attitudes toward the transferium.

We will also examine which types of environmental concerns (i.e., egoistic, altruistic, or biospheric) are especially related to attitudes toward transferium use.

Next, we assume that attitudes—together with subjective norms and PBC—determine intention to use the transferium. Based on the TPB, we propose the following:

Hypothesis 3. Positive attitudes toward the transferium, positive subjective norms, and high PBC will be related to stronger intention to use the transferium.

Method

Respondents and Procedure

We conducted a study in the city of Groningen to examine how a newly planned transferium could best be developed. The study was conducted early in the planning process, so respondents generally were unaware of the planned transferium because local authorities had not yet decided on the design of the transferium. Questionnaires were distributed among respondents who regularly visit the center of Groningen for the purpose of shopping or working. We only selected respondents who lived in southwest Groningen because they would pass the planned transferium. Shoppers were recruited in different parking garages in the city center. They were approached and asked whether they lived in the southwest of Groningen. When shoppers confirmed this, they were asked to participate in the study. Those who agreed to participate received a survey and a postage-paid reply envelope.

Employees were approached via their employers. We selected four large organizations located in the city center of Groningen to participate in the study. The organizations were asked to distribute surveys among their employees living in southwest Groningen. Organizations selected their employees via postal code matching.³

In total, 702 questionnaires were distributed: 305 respondents returned their questionnaires, of which 74 respondents (24%) traveled to Groningen for shopping purposes and 231 (76%) for working purposes. The response rate was 32% for shoppers and 49% for employees, respectively. We excluded 6 shoppers' questionnaires and 81 employees' questionnaires from further data analysis because these respondents did not live in southwest Groningen or because they did not commute by car. Thus, a total of 218 questionnaires (48% male, 52% female) were used in data analysis. Respondents' ages ranged from 21 to 69 years ($M = 43.2$, $SD = 11.3$). The majority of respondents were highly educated (73%) and had an above average income (64%).

Materials

The questionnaire was comprised of questions on attitudes, subjective norms, PBC, intention toward use of the transferium, environmental concerns, and personal background information. Because a strong relationship between the variables of the TPB can only be expected when questions are situation-specific (Ajzen & Fishbein, 1980), two versions of the question-

³*Postal code matching* refers to selecting only those respondents who live in certain postal code areas (in this case, all areas southwest of Groningen).

naires were created: one for shoppers and one for employees. All questions were similar except for the addition of "for working purposes" or "for shopping purposes," respectively, in questions on attitudes, subjective norms, PBC, and intention. For this reason, the hypotheses will be tested for shoppers and employees separately.

The questionnaire consists of five parts. The first part addresses respondents' present car use for working and shopping purposes, respectively. The second part focuses on the variables of the TPB. In the third part, respondents indicate what kind of facilities and features will stimulate them to use the transferium. The fourth part focuses on environmental concerns. The last part is comprised of sociodemographic questions. In the present paper, only data from the second and fourth part of the questionnaire are discussed.

Intention. The dependent variable of intention to use the transferium was measured by the item "Do you intend to use the transferium when you travel to Groningen for shopping purposes?" or "Do you intend to use the transferium when you travel to Groningen for working purposes?" Responses were rated on a 5-point scale ranging from 1 (*definitely*) to 5 (*definitely not*). Shoppers had a mean score of 2.85 on intention to use the transferium ($SD = 1.10$). Employees were less inclined to use the transferium ($M = 3.54$, $SD = 1.02$).

Attitudes. Respondents evaluated the importance and likelihood of the following 13 aspects to use the transferium for shopping and working trips, respectively: travel costs, travel time, comfort, flexible departure time, take-along luggage, environment, health, safety, privacy, weather, availability of parking spaces, traffic jams and delays, and relaxation. These aspects were selected from previous studies on travel mode choice (e.g., Rooijers & Steg, 1991; Steg, 1996). First, respondents rated the importance of these aspects for shopping and working trips, respectively, on a 5-point scale ranging from 1 (*extremely important*) to 5 (*not important*). Next, respondents indicated the likelihood that use of the transferium would result in these outcomes. Scores were rated on a 5-point scale ranging from 1 (*extremely likely*) to 5 (*extremely unlikely*).

Scores on attitudes toward the transferium were computed by summing the products of each behavioral belief and its corresponding importance rating. Next, mean product scores were computed for shoppers and employees. Shoppers' attitudes toward using the transferium were slightly more positive, compared to the attitudes of employees (shoppers: $M = 5.85$, $SD = 1.56$; employees: $M = 6.57$, $SD = 1.63$). Internal consistency, as measured by Cronbach's alpha, was .72 for both shoppers and employees.

Subjective norms. Normative beliefs were measured for two reference groups: *my family* and *my friends*. For employees, the reference groups of *my colleagues* and *my employer* were included as well.

First, respondents indicated whether these reference groups think that they should use the transferium for shopping (or working) purposes. Scores were rated on a 5-point scale ranging from 1 (*totally agree*) to 5 (*totally disagree*). For the same reference groups, respondents were asked to what extent they were motivated to comply with the expectations of these groups. Scores were rated on a 5-point scale ranging from 1 (*very much*) to 5 (*totally not*). Subjective norms were computed by summing the products of each normative belief and the corresponding motivation to comply. Cronbach's alphas of these scales were .92 and .87 for shoppers and employees, respectively.

Perceived behavioral control. PBC was measured with the question "Are you able to use the transferium?" The item was rated on a 5-point scale ranging from 1 (*definitely*) to 5 (*definitely not*). Mean scores were 1.71 ($SD = 0.79$) and 2.33 ($SD = 1.02$) for shoppers and employees, respectively.

Environmental concerns. A translated version of the questionnaire developed by Schultz (2000, 2001) was used to measure environmental concerns. Respondents rated the importance of consequences of environmental problems for oneself, others, and the biosphere on a 5-point scale ranging from 1 (*extremely important*) to 5 (*not important*).

The following 12 items were rated: me, my lifestyle, my health, my future (egoistic concerns), people in my country, all people, future generations, people in the community (altruistic concerns), plants, birds, marine life, and animals (biospheric concerns). The items were put in random order. Multiple group method (Nunnally, 1978; Ten Berge & Siero, 2001) reveals that the three clusters of environmental concerns could indeed be distinguished. However, the item "people in the community" did not correlate strongly with the altruistic concerns scale and, therefore, was not included in this scale.

Mean scores were computed on the items that were included in each scale. Internal consistency was .93 ($M = 2.01$, $SD = 0.79$), .91 ($M = 1.71$, $SD = 0.71$), and .95 ($M = 1.79$, $SD = 0.79$) for egoistic, altruistic, and biospheric concerns, respectively.

Results

Correlations Between Environmental Concerns, Attitudes, Subjective Norms, PBC, and Intention Toward the Transferium

Correlation coefficients were calculated between environmental concerns, attitudes, subjective norms, PBC, and intention toward the transferium. As shown in Table 1, the three types of environmental concerns were strongly related to each other for both shoppers and employees (range = .61 to .84).

Table 1

Correlations Between Variables and Intention Toward Using the Transferium for Shoppers and Employees

	1	2	3	4	5	6
Shoppers ($N = 68$)						
1. Egoistic	—					
2. Altruistic	.76	—				
3. Biospheric	.61	.72	—			
4. Attitudes	.48	.35	.40	—		
5. SN	.02	.13	.07	.34	—	
6. PBC	.26	.17	.06	.04	-.10	—
7. Intention	.17	.13	.05	.58	.44	.26
Employees ($N = 150$)						
1. Egoistic	—					
2. Altruistic	.84	—				
3. Biospheric	.76	.81	—			
4. Attitudes	.35	.30	.24	—		
5. SN	.24	.20	.20	.28	—	
6. PBC	.08	.10	.05	-.06	.26	—
7. Intention	.20	.20	.15	.36	.38	.32

Note. SN = subjective norm; PBC = perceived behavioral control.

For shoppers, attitudes were strongly correlated with all three types of environmental concerns ($r_{\text{ego}} = .48, p < .01$; $r_{\text{alt}} = .35, p < .01$; $r_{\text{bio}} = .40, p < .01$). Also, egoistic concerns were correlated to PBC ($r = .26, p < .05$).

For employees, similar results were found. Again for employees, egoistic, altruistic, and biospheric concerns were all related to attitudes ($r_{\text{ego}} = .35, p < .01$; $r_{\text{alt}} = .30, p < .01$; $r_{\text{bio}} = .24, p < .01$). Furthermore, all three environmental concerns also were positively correlated with subjective norms ($r_{\text{ego}} = .24, p < .01$; $r_{\text{alt}} = .20, p < .05$; $r_{\text{bio}} = .20, p < .05$). Only egoistic and altruistic concerns were significantly related to intention ($r_{\text{ego}} = .20, p < .05$; $r_{\text{alt}} = .20, p < .05$).

For shoppers, intention to use the transferium was correlated most strongly with attitudes ($r = .58, p < .01$) and subjective norms ($r = .44, p < .01$) and less strongly with PBC ($r = .26, p < .05$). Also, attitudes appeared to be related to subjective norms ($r = .34, p < .01$). For employees, intention

to use the transferium was related to attitudes ($r = .36, p < .01$), subjective norms ($r = .38, p < .01$) and PBC ($r = .32, p < .01$). Strengths of these relationships did not differ much. Again, attitudes appeared to be related to subjective norms ($r = .28, p < .01$), while subjective norms correlated to PBC as well ($r = .26, p < .01$).

Relationship Between Environmental Concerns, Attitudes, and Intention Toward the Transferium

Analysis of mediation (Baron & Kenny, 1986) was used to test whether attitudes toward the transferium mediate the relationship between environmental concerns and intention toward using the transferium. First, the predictor variable, environmental concerns, was positively related to the mediator; that is, attitudes toward the transferium. The three clusters of environmental concerns explained 26% of the variance in attitudes of shoppers, $F(3, 64) = 7.29, p < .001$ (see Table 2) and 13% of the variance in attitudes of employees, $F(3, 146) = 6.95, p < .001$ (see Table 3). In both cases, only egoistic concerns contributed significantly to the explanation of attitudes toward the transferium. The more people were concerned about the consequences of environmental problems for themselves, the more positive were their attitudes toward the transferium (shoppers: $\beta = .46, p < .01$; employees: $\beta = .34, p < .05$).

Second, the three clusters of environmental concerns were hardly related to intention to use the transferium. For shoppers, the relationship is not significant ($R^2 = .04$), $F(3, 64) = 0.77, p = .52$. A marginally significant effect is shown for employees ($R^2 = .05$), $F(3, 146) = 2.27, p = .08$.

Third, attitudes toward the transferium were positively related to intention for shoppers ($R^2 = .33$), $F(3, 64) = 33.06, p < .001$; and for employees ($R^2 = .13$), $F(1, 148) = 22.52, p < .001$. For shoppers, the model was also significant when both environmental concerns and attitudes were included ($R^2 = .38$), $F(4, 63) = 9.75, p < .001$. Again, only attitudes toward the transferium contributed significantly to this model ($\beta = .68$), $t(63) = 5.95, p < .001$. When both environmental concerns and attitudes were entered into the regression model for employees, 14% of the variance in intention was explained, $F(4, 145) = 5.98, p < .001$. Not surprisingly, attitudes toward the transferium were the only significant predictor in this model ($\beta = .33$), $t(144) = 4.05, p < .001$, while the three clusters of environmental concerns did not contribute to the model for employees.

Thus, the three clusters of environmental concerns were related to attitudes toward the transferium, but not to intention to use the transferium. Although, strictly speaking, attitudes do not mediate the relationship

Table 2

Multiple Regression Analyses to Test Mediation Model of Environmental Concerns, Attitudes, and Intention to Use the Transferium for Shoppers

	β	t	R^2	Adj. R^2	F	df
DV Attitudes			.26***	.22***	7.29	3, 64
Egoistic	.46**	2.74**				
Altruistic	-.17	-0.90				
Biospheric	.24	1.55				
DV Intention			.04	-.01	0.77	3, 64
Egoistic	.19	1.02				
Altruistic	.06	0.26				
Biospheric	-.11	-0.61				
DV Intention			.33***	.32***	33.06	1, 66
Attitudes	.58***	5.75***				
DV Intention			.38***	.34***	9.75	4, 63
Attitudes	.68***	5.95***				
Egoistic	-.12	-0.74				
Altruistic	.17	0.99				
Biospheric	-.27	-1.87				

Note. $N = 68$. DV = dependent variable.

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

between environmental concerns and behavior, as formulated by Baron and Kenny (1986), these results are partly in contradiction with our expectations because environmental concerns were related to attitudes and not to intentions toward transferium use.

Explaining Intention to Use the Transferium

Intention to use the transferium was regressed on attitudes, subjective norms, and PBC toward the use of the transferium for shoppers and employees. Figure 1 summarizes the regression coefficients for shoppers and employees.

Table 4 shows the results for people who travel to Groningen for shopping purposes. The three independent variables explained 47% of the vari-

Table 3

Multiple Regression Analyses to Test Mediation Model of Environmental Concerns, Attitudes, and Intention to Use the Transferium for Employees

	β	t	R^2	Adj. R^2	F	df
DV Attitudes			.13***	.11***	6.95	3, 146
Egoistic	.34*	2.32*				
Altruistic	.09	0.55				
Biospheric	-.10	-0.70				
DV Intention			.05	.03	2.27	3, 46
Egoistic	.11	0.70				
Altruistic	.16	0.93				
Biospheric	-.06	-0.43				
DV Intention			.13***	.13***	22.52	1, 148
Attitudes	.36***	4.75***				
DV Intention			.14***	.12***	5.98	4, 145
Attitudes	.33***	4.05***				
Egoistic	-.01	-0.05				
Altruistic	.13	0.79				
Biospheric	-.03	-0.22				

Note. $N = 150$. DV = dependent variable.

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

ance in intention to use the transferium, $F(3, 64) = 18.95$, $p < .01$. All three variables contributed significantly to the explanation of intention to use the transferium. The more positive the attitudes toward the transferium ($\beta = .46$, $p < .01$), the stronger the subjective norms ($\beta = .31$, $p < .05$), and the higher the PBC ($\beta = .27$, $p < .05$), the more shoppers intended to use the transferium.

Table 5 shows that for employees, attitudes, subjective norms, and PBC explained 29% of the variance in intention to use the transferium, $F(3, 146) = 19.88$, $p < .01$. The three independent variables all significantly contributed to the explanation of intention to use the transferium in the expected direction. Again, attitudes were most strongly related to intention ($\beta = .32$, $p < .01$), followed by PBC ($\beta = .28$, $p < .01$), and subjective norms ($\beta = .22$, $p < .01$).

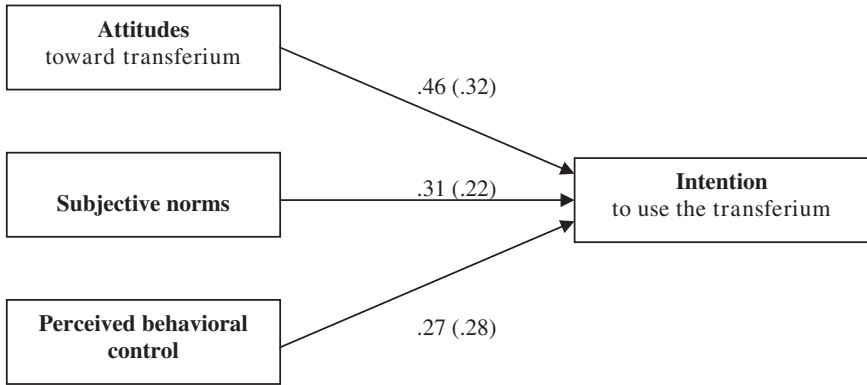


Figure 1. Regression model to test the theory of planned behavior, including regression coefficients for shoppers ($N = 68$) and employees ($N = 150$). Regression coefficients for employees appear in parentheses.

Table 4

Regression of Intention to Use the Transferium on Attitudes, Subjective Norms, and Perceived Behavioral Control for Shoppers

	β	R^2	$F(3, 64)$
Total		.47***	18.95
Attitudes	.46***		
PBC	.27**		
SN	.31**		

Note. $N = 68$. SN = subjective norm; PBC = perceived behavioral control.

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

Discussion

This study extends the theory of planned behavior by including environmental concerns in the model. Expectations about the relationships between environmental concerns, attitudes toward the transferium, and intention to use the transferium were partly confirmed. Environmental concerns were directly related to attitudes toward use of the transferium. However, no direct relationship was found between environmental concerns and intention to use the transferium.

Table 5

Regression of Intention to Use the Transferium on Attitudes, Subjective Norms, and Perceived Behavioral Control for Employees

	β	R^2	$F(3, 146)$
Total		.29***	16.49
Attitudes	.32***		
PBC	.28***		
SN	.22**		

Note. $N = 150$. SN = subjective norm; PBC = perceived behavioral control.

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

The three types of environmental concerns were related to attitudes toward the transferium, but not to intention to use the transferium. Thus, the mediating role of attitudes could not be established. Still, these findings are in line with the results of Bamberg (2003), who also found a strong relationship between environmental concerns and situation-specific beliefs, but no relation between environmental concerns and behavioral intentions (i.e., using a green electricity brochure). These results suggest that the finding that environmental concerns are not directly related to behavioral intentions within a TPB framework may be generalized across different (low- and high-cost) behaviors.

Egoistic concerns appeared to be most strongly related to attitudes toward the use of the transferium for both groups. People with high egoistic concerns had more positive attitudes toward the transferium than did people with low egoistic concerns. This result suggests that people especially evaluate the consequences of using the transferium in terms of concerns for themselves.

These findings are in line with recent theories assuming that egoistic values and concerns can positively relate with environmental behavior when this behavior is compatible with self-interests (Schultz et al., 2005; Stern & Dietz, 1994; Stern et al., 1993). Although this assumption has been widely advocated, empirical support is lacking. Most studies have shown that general pro-environmental beliefs, intentions, and behavior are positively related to altruistic or biospheric values and concerns, and negatively related to egoistic values and concerns (e.g., De Groot & Steg, 2007; Nordlund & Garvill, 2002, 2003; Schultz et al., 2005; Stern & Dietz, 1994; Stern, Dietz, & Guagnano, 1998; Van Vugt et al., 1995).

The results reported in this paper provide evidence for the assumption that egoistic concerns can be a strong predictor for behavior-specific beliefs (e.g., attitudes) as well. However, the three types of environmental concerns were strongly related, reducing the likelihood that all three types of environmental concerns can contribute uniquely to the explanation of attitudes toward the transferium. Strong correlations between the three types of environmental concerns have been found in earlier studies in which this instrument was used (Schultz, 2000, 2001; Steg, De Groot, Dreijerink, & Abrahamse, 2006) suggesting that the three types of environmental concerns are not fully independent. However, egoistic concerns still appeared to be the most significant predictor in this respect.

Egoistic concerns as the strongest predictor of attitudes toward the transferium has some practical implications for local authorities. First, in order to promote attitudes in favor of using the transferium, it is important to focus on messages that emphasize individual advantages of using the transferium. In line with this, local authorities should monitor whether use of the transferium indeed provides the expected individual advantages. If not, implementation should be adjusted to make sure that attitudes in favor of the transferium will be enduring. Besides, local authorities may advocate the positive effects on environmental and social qualities (e.g., urban quality of life) since altruistic and biospheric concerns were positively associated with attitudes, although less strongly.

This study examined the relationships between attitudes, subjective norms, and perceived behavioral control and intention to use the transferium. The results reveal, as hypothesized, that a positive attitude, a positive subjective norm, and high perceived behavioral control are related to stronger intentions to use the transferium. This result is in agreement with Ajzen's (1985) theory of planned behavior. For both groups, attitudes appeared to be the best predictor, followed by perceived behavioral control and subjective norms. It is hard to draw general conclusions about the relative contribution of these three predictors in explaining travel behavior because studies on travel mode choice have used different target behaviors and target groups.

Predictors of the TPB explain much more variance in shoppers' intention to use the transferium, compared to intentions of employees. A possible explanation for this result is that shoppers have a stronger intention to use the transferium in the first place. For them, the transferium offers more advantages, compared to employees (for more details, see De Groot, 2003). Results not reported here reveal that, at present, employees hardly paid for parking and did not encounter parking problems. In contrast, shoppers reported difficulties finding parking spaces, and they spent more money on parking fees (see De Groot, 2003). This suggests that for shoppers, car use

had some disadvantages that may not apply to use of the transferium, while employees did not face these disadvantages. These perceived differences may affect their attitudes and PBC and, consequently, intention to use the transferium. Indeed, shoppers had more favorable attitudes toward the transferium and higher levels of PBC than did employees.

A limitation of present study is that actual behavior could not be taken into account because the transferium is not yet in place. Arguably, intention as a dependent measure is less strong than a behavioral measure because intention may not always result in behavior. However, different studies have shown that intention often predicts behavior (for an overview, see Armitage & Conner, 2001). Thus, studying intention and underlying determinants can provide useful insights in research on travel mode choice.

The approach of this study—that is, the integration of environmental concerns within Ajzen's (1985) theory of planned behavior—can provide important insights to policymakers in motivations that underlie intention to use a new transferium. The results of our study suggest that interventions should focus on attitudes, subjective norms, and perceived behavioral control. Also, attitudes appeared to be most strongly related to egoistic concerns. This result implies that in order to promote attitudes in favor of using the transferium, it is important to focus on messages that emphasize the direct individual advantages of using the transferium. This may facilitate the promotion of using the transferium.

References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11–39). Heidelberg, Germany: Springer.
- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Milton Keynes, UK: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*, 22, 453–474.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.

- Armitage, C. J., Norman, P., & Conner, M. (2002). Can the theory of planned behaviour mediate the effects of age, gender, and multidimensional health locus of control? *British Journal of Health Psychology*, 7, 299–316.
- Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of Environmental Psychology*, 23, 21–32.
- Bamberg, S., & Schmidt, P. (1993). Verkehrsmittelwahl—eine Anwendung der Theorie geplanten Verhalten [Choosing between means of transportation: An application of the theory of planned behavior]. *Zeitschrift für Sozialpsychologie*, 24, 25–37.
- Bamberg, S., & Schmidt, P. (2001). Theory-driven subgroup-specific evaluation of an intervention to reduce private car use. *Journal of Applied Social Psychology*, 31, 1300–1329.
- Bamberg, S., & Schmidt, P. (2003). Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environment and Behavior*, 35, 264–285.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Cameron, L. D., Brown, P. M., & Chapman, J. G. (1998). Social value orientations and decisions to take proenvironmental action. *Journal of Applied Social Psychology*, 28, 675–697.
- De Groot, J. I. M. (2003). *Transferium Hoogkerk: Onderzoek naar gebruik en inrichting van het Transferium Hoogkerk* [Transferium Hoogkerk: Planning and use of the Transferium Hoogkerk]. Groningen, The Netherlands: University of Groningen.
- De Groot, J. I. M., & Steg, L. (2007). Value orientations and environmental beliefs in five countries: Validity of an instrument to measure egoistic, altruistic, and biospheric value orientations. *Journal of Cross-Cultural Psychology*, 38, 318–332.
- Dietz, T., Stern, P. C., & Guagnano, G. A. (1998). Social structural and social psychological bases of environmental concern. *Environment and Behavior*, 30, 450–471.
- Eek, D., Loukopoulos, P., Fujii, S., & Gärling, T. (2002). Spill-over effects of intermittent costs for defection in social dilemmas. *European Journal of Social Psychology*, 32, 801–813.
- Forward, S. E. (1997). *Measuring attitudes and behaviour using the theory of planned behaviour*. In T. Rothengatter & E. Carbonell Vayá (Eds.), *Traffic and transport psychology: Theory and application* (pp. 353–365). Amsterdam, The Netherlands: Pergamon.

- Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology, 23*, 1–9.
- Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on attitude–behavior relationships: A natural experiment with curbside recycling. *Environment and Behavior, 27*, 699–718.
- Harland, P., Staats, H., & Wilke, H. A. M. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology, 29*, 2505–2528.
- Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior: Predicting the use of public transportation. *Journal of Applied Social Psychology, 32*, 2154–2189.
- Hunecke, M., Blöbaum, A., Matthies, E., & Höger, R. (2001). Responsibility and environment: Ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior, 33*, 830–852.
- Joireman, J. A., Van Lange, P. A. M., Kuhlman, D. M., Van Vugt, M., & Shelley, G. P. (1997). An interdependence analysis of commuting decisions. *European Journal of Social Psychology, 27*, 441–463.
- Kaiser, F. G., Wölfling, S., & Fuhrer, U. (1999). Environmental attitude and ecological behavior. *Journal of Environmental Psychology, 19*, 1–19.
- Karp, D. G. (1996). Values and their effects on pro-environmental behavior. *Environment and Behavior, 28*, 111–133.
- Marcil, I., Bergeron, J., & Audet, T. (2001). Motivational factors underlying the intention to drink and drive in young male drivers. *Journal of Safety Research, 32*, 363–376.
- Ministry of Transport, Public Works, and Water Management. (2001). *Transferia: Een handreiking bij voorbereiding en realisatie* [Transferia: A guide for planning and implementation]. The Hague, The Netherlands: Author.
- Moyano Díaz, E. (2002). Theory of planned behavior and pedestrians' intentions to violate traffic regulations. *Transportation Research (Part F), 5*, 169–175.
- Nordlund, A. M., & Garvill, J. (2002). Value structure behind proenvironmental behavior. *Environment and Behavior, 34*, 740–756.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology, 23*, 339–347.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

- Parker, D., Manstead, A. S. R., & Stradling, S. G. (1995). Extending the theory of planned behaviour: The role of the personal norm. *British Journal of Social Psychology, 34*, 127–137.
- Parker, D., Manstead, S. R., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992). Intention to commit driving violations: An application of the theory of planned behavior. *Journal of Applied Psychology, 77*, 94–101.
- Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern, and environmental behavior: A study into household energy use. *Environment and Behavior, 36*, 70–93.
- Rooijers, A. J., & Steg, E. M. (1991). *De rol van gewoonte(-gedrag) bij vervoermiddelkeuze* [Role of habit(ual behaviour) in travel mode choice]. Haren, The Netherlands: Verkeerskundig Studiecentrum, Rijksuniversiteit Groningen.
- Schultz, P. W. (2000). Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues, 56*, 391–406.
- Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology, 21*, 327–339.
- Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franěk, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology, 36*, 457–475.
- Schultz, P. W., & Zelezny, L. C. (1998). Values and pro-environmental behavior: A five-country survey. *Journal of Cross-Cultural Psychology, 29*, 540–558.
- Steg, L. (2003). Can public transport compete with the private car? *IATSS Research, 27*, 27–35.
- Steg, E. M. (1996). *Gedragverandering ter vermindering van het autogebruik* [Behavioural change for reduction of car use]. Doctoral dissertation, University of Groningen, Department of Psychological, Pedagogical, and Sociological Sciences, Groningen, The Netherlands.
- Steg, L., De Groot, J., Dreijerink, L., & Abrahamse, W. (2006). *General antecedents of personal norms and environmental behavior: The role of values, worldviews, and environmental concern*. Submitted for publication.
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: Testing VBN theory. *Journal of Environmental Psychology, 25*, 415–425.
- Steg, L., & Sievers, I. (2000). Cultural theory and individual perceptions of environmental risks. *Environment and Behavior, 32*, 250–269.
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*, 407–424.

- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65–84.
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The new ecological paradigm in social psychological context. *Environment and Behavior, 27*, 723–743.
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A brief inventory of values. *Educational and Psychological Measurement, 58*, 984–1001.
- Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior, 25*, 322–348.
- Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. A. (1995). Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology, 25*, 1611–1636.
- Ten Berge, J. M. F., & Siero, F. W. (2001). The basic ideas of factor analysis. *Metodologia de las Ciencias del Comportamiento, 2*, 217–232.
- Van Vugt, M., Meertens, R. M., & Van Lange, P. A. M. (1995). Car versus public transportation? The role of social value orientations in a real-life social dilemma. *Journal of Applied Social Psychology, 25*, 258–278.
- Verplanken, B., Aarts, H., Van Knippenberg, A., & Moonen, A. (1998). Habit versus planned behaviour: A field experiment. *British Journal of Social Psychology, 37*, 111–128.