# How habits interfere with norm-directed behaviour: A normative decision-making model for travel mode choice ☆

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## Abstract

This paper deals with the question how habits can be integrated into a model of normative decision-making based on the work of Schwartz and Howard (1981). A field study was conducted in Bochum, Germany, involving 160 participants. After a personal interview the participant had to protocol the travel mode choice on their trips to work in a logbook for the period of 4 weeks. The data illustrates that on the trip to work there is no direct effect of car-choice habits on travel mode choice additional to the personal norm, but a moderating effect of habit strength on the relation between personal norm and travel mode choice. It is argued that different levels of specificity of habit lead either to a moderating effect of habit (strong specific habit) or an additional direct effect (weak specific habit).

## 1. Introduction

Protecting the world's climate has become one of the most urgent tasks of modern society. Global emissions of climate effective $CO_2$ have crested in 1996 nearly quadruplicating the level of emissions of 1950 (United Nations Environment Program, 2000). The three parts per million increase in the atmospheric concentration of carbon dioxide in 1998 was the largest ever recorded (World Watch Institute, 2000). These vast amounts of polluting emissions may result in a possible change of world's climate threatening both human and nonhuman life in a scale humanity has never faced before. Private car use is one of the most important contributors to climate change. The problems related to car use do not only call for technological solutions (e.g.

reduction of fuel consumption by constructing more efficient engines) but also for changes in people's everyday behaviour.

Thus, we chose travel mode choice as the target behaviour of our study for two reasons: on the one hand air pollution caused by extensive private use of automobiles is responsible for a substantial proportion of the world's environmental problems and is therefore a relevant domain for psychological contributions. Furthermore, the individual decision to use a car is a potential starting point for interventions to reduce pollutant behaviour. In most European urban areas alternative modes of transportation like public transportation, going by bicycle or walking constitute a viable alternative to private car use. On the other hand, the choice of travel mode is a repeated action especially for everyday routes like the way to work. Thus, the potential influence of habits on these decisions is extremely high. Hence, travel mode choice is an ideal example of a routine behaviour in a context that has normative implications. Findings of this study may be generalized to behaviour in other comparable settings.

## 1.1. The model of normative decision-making

One prominent branch of theories that deal with solving environmental problems from a psychological perspective can be traced back to the theoretical positions of Schwartz (1977) and Schwartz and Howard (1981). Schwartz' *Model of Normative Decision-Making* (NDM) deals with behaviour that is referring to social and personal norms and is therefore triggering the individual's normative system. Schwartz and Howard conceptualize behaviour in these contexts as being caused by feelings of moral obligation to act in a norm concordant way. This feeling of moral obligation in turn is caused by activated *Personal Norms* (PN), which are—from a biographical point of view—internalized and therefore adapted *Social Norms* (SN) that might themselves be understood as perceived expectations of relevant others. Parts of the model of normative decision-making have been tested by several researchers since its publication and have been successfully applied to the context of conservationist behaviour (e.g. Hopper & Nielsen, 1991; Hunecke, Blöbaum, Matthies, & Höger, 2001; Joireman, Lasane, Bennett, Richards, & Solaimani, 2001).

In order to understand where exactly habits may be integrated into the process of normative decision-making we first have to describe the NDM in detail. Schwartz and Howard (1981) conceive of normative decisions as being reached in a four-stage process (see upper half of Fig. 1). The first *Attention Stage* covers the

necessary preconditions to get the process of normative decision-making on the way. In a situation where the environment needs protection the process of normative decision-making can only start if you are aware of this need (*Awareness of Need*, AN). In other words, if you do not recognize the use of cars as being problematic to the environment no normative decision-making will occur (note that this does not necessarily lead to the decision to use the car in the given situation, only that the process of decision-making is not guided by norms). The second component of the Attention Stage is the *Awareness of Consequences* of the individual's actions (AC). If the actor is not aware that his personal actions have a positive or negative impact on the environment no moral decision-making will take place even if awareness of need is given. The third necessary component to start the process is the recognition of ones own ability to engage in actions to help the environment. In the case of environmental protection we prefer to speak of *Perceived Behavioural Control* (PBC) over ones actions. PBC is therefore identical to the construct used in the Theory of Planned Behaviour (Ajzen, 1991). There will be no moral decision unless the individual perceives at least a minimum of control over his or her actions. If all three first steps required are taken the process of normative decision-making enters stage two: the *Motivation Stage* (or as Schwartz & Howard, 1981 call it: the generation of feelings of obligation). At this stage different motivational systems are triggered. First, there is the motive of behaving consistently with ones internal

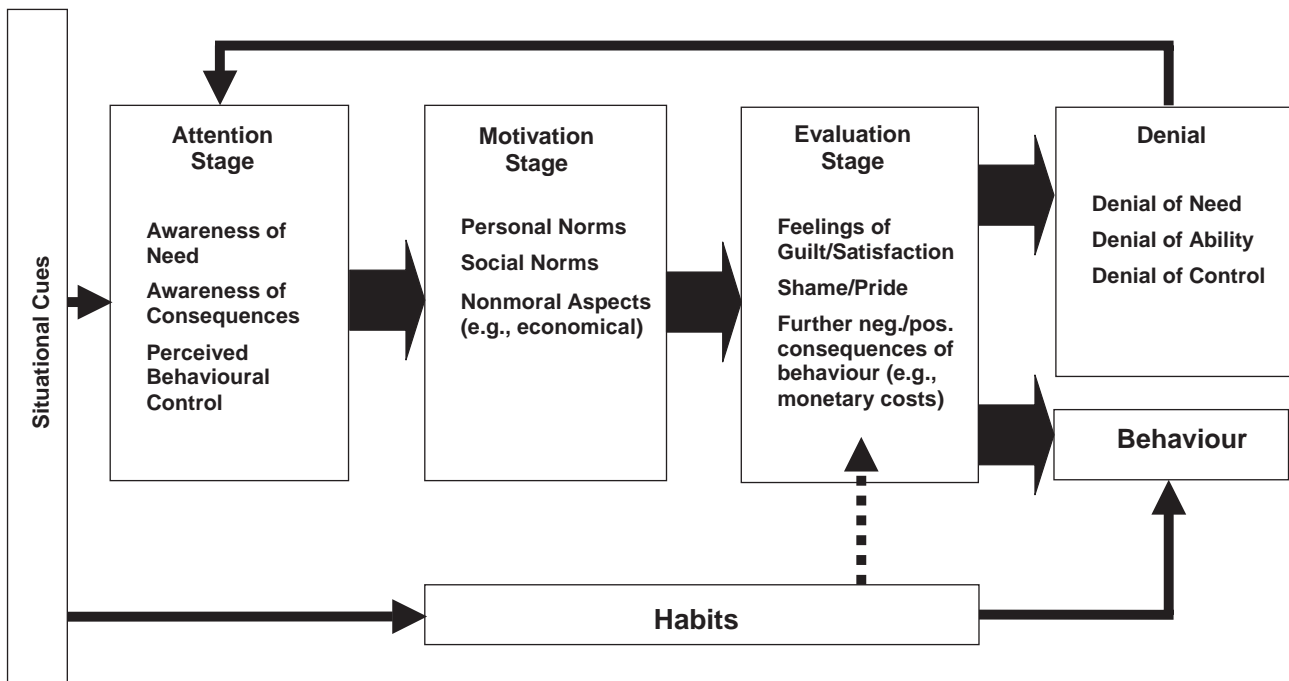HOW HABITS INTERFERE WITH NORM DIRECTED BEHAVIOUR



Fig. 1. The extended model of normative decision making.

value system. According to Schwartz and Howard (1981) these PNs are internalized social norms but become at least in parts independent of the social norms by the integration into the personal value system. In case of travel mode choice these aspects reflect the feeling of obligation not to use the car for conservationist reasons. Second, there is a motive to behave in accordance with the expectations of relevant others. These SNs reflect the influence of perceived general normative pressure. A third system of motives is not moral in nature. These aspects subsume for example the motives to save money or time, to have comfort or to feel safe. According to Schwartz and Howard (1981) we call these aspects *Nonmoral Motives*. Activated PN, SN and nonmoral motives directly lead to the central stage of the NDM: the *Evaluation Stage*. At this third stage, the benefits and costs of possible alternative actions are anticipated and weighted according to the three motivational systems of the motivational stage. *Feelings of Guilt* (FG) for causing damage to the environment are possible costs of actions that do not match the PN. Feelings of satisfaction are the corresponding benefit. *Shame*, *Pride* and *Social Appreciation* are costs and benefits according to SN. Monetary costs, the anticipated loss of time, comfort or safety are costs according to nonmoral motivations. Saving money or time, travelling comfortably and safe are the respective anticipated benefits. The result of this process of weighing up may be a clear decision for one of the alternative behaviours. If such a clear decision can be reached this action is performed. If the decision is uncertain or there is no decision at all because the evaluation ended in a tie of pros and cons, a fourth stage of *Denial* (D) is entered. At this stage the components of the first stage are reinterpreted so that the process of moral decision-making starts under new conditions or the moral components of decision-making are eliminated entirely. Possible mechanisms at this stage are to deny ones responsibility for the protection of the environment, to deny the problem completely (reducing AN), to deny the consequences ones actions have (reducing AC), or to deny the personal control over ones action (reducing PBC).

Although Schwartz and Howard have focussed their research efforts on pro-social behaviour (e.g. Schwartz, 1977; Schwartz & Howard, 1981) they explicitly conceive of their model as being applicable to all kinds of altruistic behaviour. Therefore, the domain of the NDM extends to all kinds of actions that are performed in contexts triggering normative motives. Many researchers argued that protecting the environment can be seen as a kind of altruistic behaviour (e.g. Hopper & Nielsen, 1991). They hold the view that environmental protective behaviour is costly but does not provide the actor with immediate rewards which is a characteristic of altruistic behaviour. Undoubtedly environmental protection has not only developed to be an important

target of politics, but furthermore environmental protection has become a topic of social norms in everyday life. For example, in 1996 more than 50% of the Germans fully agreed to the proposition that all citizens *should* be ready to change their current lifestyles in order to protect the environment (Preisendörfer, 1996). Kaiser and Shimoda (1999) argued that people seem to feel *morally* responsible for the environment rather than feeling the urge to fulfil social expectations. According to these authors feelings of guilt are the driving force behind a large amount of ecological behaviour. Hunecke et al. (2001) were able to show that personal norms are the integrating construct that determines environmental protective behaviour in the domain of travel mode choice. That means that NDM is a valid way to describe decisions made concerning the environment.

## 1.2. The case of repeated actions

As we have seen the NDM has proven to be very powerful in predicting behaviour that is shown only occasionally. However, much if not most of everyday behaviour can be considered as *repeated actions*. They occur very often—some of them every day—under the same circumstances. How good does NDM deal with this kind of behaviour? Bad habits keep us for example from excluding unhealthy food off our diet, exercising at the gym or saving energy by switching off the lights even if we feel morally obliged. Considering those experiences it seems highly plausible that habits control at least parts of our lives which we then like to call routines.

However, before we start a discussion about recent findings of habit research we like to define the key concepts of this discussion. Many researchers use habit, routine, repeated actions, and past behaviour as synonyms with which we do not agree. We understand *Habit* as a behavioural script (see Abelson, 1981 for a discussion of the script concept) that mediates between situational cues and behavioural patterns. The association between cues and patterns of behaviour is learned by repeating the same behaviour under the same circumstances over and over again. Habitual behaviour is almost totally under control of these behavioural scripts. *Past Behaviour* is the complete pattern of behaviour shown prior to the actual behaviour. It includes habitual components as well as intentional behaviour, behaviour guided by norms or behaviour under the control of the situation. As it can be seen habitual behaviour is only a part of past behaviour. Furthermore, past behaviour includes repeated actions as well as actions shown only once or occasionally. Past behaviour is therefore very vague and no theoretically valid predictor of future behaviour. *Repeated Actions* are that part of past behaviour that is frequently repeated. *Routines* are those repeated actions that are

under control of habitual scripts. They are conducted explicitly without deliberate thinking which means they are not considered consciously.

The mentioned missing integration of habits into NDM may be due to the fact that habits are extremely difficult to measure (for a more detailed discussion on that problem see Aarts, 1996; Klöckner, Matthies, & Hunecke, 2003). The first studies that included habit used past behaviour as an indicator of habits (e.g. Triandis, 1980). As we discussed earlier past behaviour is a more global concept than habit. Therefore, past behaviour is not a valid operationalization of habit as we argued above. A second approach was to ask people to name how much their past behaviour was under control of habits (e.g. Wittenbraker, Gibbs, & Kahle, 1983). This requires that people have a reliable representation of their past actions and how much they were controlled by habits. We doubt that people can provide information about routines which are by definition conducted unconsciously. The most recent operationalization of habit was introduced by Verplanken, Aarts, van Knippenberg, and van Knippenberg (1994). They used the script-like nature of habit that results in the use of very few given information to measure it by turning the table. They present a set of travel goals (e.g. visiting a friend in a neighbouring city) to the participants of their study. Information about situations was reduced as much as possible to force the participants to rely on their behavioural scripts. Then the participants were asked to name the first travel mode that came to their mind. The more homogenous the answers focused on one travel mode (e.g. car) the stronger and the more general they considered the habit to use this mode to be. Klöckner et al. (2003) confirmed the validity and reliability of this response frequency measure (a more detailed description is given in the methods section of this article). Because of the difficulties in operationalization it was demanding to implement habits into existing models. There is still no completely satisfactory solution to this problem. No standard operationalization of habit is available although the techniques of measuring habits have evolved considerably during the last years. It does not seem to be a coincidence that habit became the more popular in psychological theory the better its operationalization got.

To face the problems on dealing with repeated behaviour there have in fact been many suggestions to extend action models with constructs like past behaviour and habit in the last years (e.g. Wittenbraker et al., 1983; Verplanken et al., 1994; Bamberg, 1996, Aarts, Verplanken, & van Knippenberg, 1997; Ouellette & Wood, 1998; Verplanken, Aarts, van Knippenberg, & Moonen, 1998). It became obvious that especially in the case of repeated actions past behaviour or habits are a powerful—sometimes the most powerful—predictor of present behaviour (see Ouellette & Wood, 1998). In most of the reported works habit was conceived of as an additional and independent predictor (e.g. Verplanken et al., 1994). Triandis (1977, 1980) furthermore conceptualized habit and intention as being counterparts. The more often an action is performed the more powerful habits will become while the influence of intention diminishes.

The NDM has never progressed in that way. Although Stern (2000) names habit as one of the key factors of environmentally significant behaviour in his framework for advancing theories of environmentally significant behaviour he has not integrated it into the structure of his model until now. Even though Schwartz (1977) suggests that habitual patterns may interfere with the process of normative decision-making and therefore inhibit its effectiveness he does not present any theoretical explanation how this interference might work.

In a previous study (Klöckner et al., 2003) we discussed two different possible ways of integrating habits into the model described. Both ways are pictured in the lower part of Fig. 1. The first way is to understand habits as being part of the nonmoral aspects weighted up at the evaluation stage. As strong habits reduce the search for and the use of situational information (Aarts et al., 1997; Verplanken, Aarts, & van Knippenberg, 1997) the existence of habits for routine behaviour saves cognitive resources and allows the individual to spend more mind power on other things like thinking about ones duties of the day while travelling to work for example. Thus, a nonmoral motive to save cognitive resources may interfere with the moral aspects of the evaluation. In other words, it seems desirable not to have to think about every detail of the travel mode choice every day and to reduce the amount of information taken into account. This reduced information promotes the execution of behavioural scripts. It makes sense to think of this sort of habits as being part of the evaluation stage because the process of norm-activation is not necessarily blocked totally. Our previous study (Klöckner et al., 2003) presents some evidence for this assumption: Adding habit to PN and SN at the evaluation stage raised the amount of explained variation in behaviour and habit becomes the best predictor of behaviour.

The second way of integrating habits tested in our previous study (Klöckner et al., 2003) was to conceptualize habits as blocking the process of normative decision-making. According to a research group around Verplanken and Aarts (Verplanken et al., 1994; Aarts, Verplanken, & van Knippenberg, 1998; Verplanken et al., 1998; Aarts, Dijksterhuis, & Midden, 1999; Verplanken & Aarts, 1999; Verplanken & Faes, 1999; Aarts & Dijksterhuis, 2000a,b) habits are considered to be behavioural scripts triggered by a set of situational cues. These scripts are formed if the same set of cues is

presented repeatedly and the same behavioural decision is always made. An association between the cues and the action develops. In the end the mere presentation of the cues is enough to elicit a certain kind of behaviour. The stronger the association between situational cues and certain actions is the less likely it is that a process of decision-making as depicted by the NDM is triggered. If the situational cues directly lead to certain behaviour they cannot be used to become aware of any need. Empirically this kind of blocking should result in a moderating effect of habit on the relation of norms and behaviour (for a methodological discussion on moderating effects see Baron & Kenny, 1986). Our previous study actually showed that the correlation between personal norm and using public transport is reduced to nonsignificance in the presence of a strong habit to use a car.

## 1.3. The present study

The aim of the present study is to test which of the described ways of integrating habits into the process of NDM is more promising. To do so we measured the travel mode choice over a period of 4 weeks and personal norm, social norm, and habit are tested as predictors. We confined ourselves to model only the motivational stage because we considered it to be the central stage of the NDM. Furthermore, we decided not to add other nonmoral motives than habit because we wanted to keep the model to test as simple as possible and focussed on habit. Furthermore, we tested the hypothesis of a moderating effect of habit strength on the relation of PN and travel mode choice.

## 2. Method

### 2.1. Subjects

The study was conducted in Bochum, a German city of approximately 400 000 inhabitants situated in the Ruhr District. The Ruhr District is a congested urban area with a comparatively good network of public transportation. To recruit our sample 3887 adult individuals were randomly selected from the telephone directory of Bochum. They received a letter that informed them about the aim of the study and that they were to be called by members of the research team. 171 of these people were not called because one *interviewer* dropped out. Two hundred and two phone numbers had changed and could not be cleared. We were not able to reach 754 people even after three calls at different times of the day. 692 people refused to answer our questions on the phone. The remaining 2068 people were first asked if they had a driving licence and at least sometimes access to a car. People with no

driving licence, seldom, or no access to a car were omitted from the study. This was done to ensure that they had a real choice between the alternative travel modes car and public transportation. The remaining 863 people were asked if they were willing to take part in the study. 246 individuals declared their willingness. 212 of them completed all parts of the study. Because this study was part of a larger scale research project that included other research interests not all remaining participants made trips to work but other less frequent trips. This resulted in 160 individuals that made at least one trip to work during the period of 4 weeks and therefore formed the sample of this study. After the first short telephone interview the participants were visited by trained interviewers who conducted a face-to-face interview including the items for personal norm, social norm, habit, and socio-demographic data. Afterwards, the interviewers explained the logbook. After 2 weeks the participants were visited a second time to check the logbook, collect the first logbook sheets, and hand out new sheets. After the participants finished their four week logbook period they were visited a last time to collect the logbook.

### 2.2. Measures

Behaviour was measured by asking the participants to report their actual travel mode choice for trips to work for a period of 4 weeks by using a standardized logbook. This logbook contained the date and time of the day at which the trip was made and the travel mode that was chosen. They were asked to write down the day's trips every evening. Trips to work that were done by modes other than public transport or car (e.g. bicycle or foot) were not reported by the participants. Thus, it was a real dichotomy between car use and the use of public transport. The sum of all reported trips to work done by public transport was divided by the total number of trips to work done by car *and* public transport during the period of 4 weeks. Therefore, we have the relative amount of trips by public transport in all trips as raw data (ranging from 0 indicating all trips done by car to 1 indicating all trips done by public transports). Because 67.4% of the sample did not use public transportation even a single time during these 4 weeks this raw data is highly skewed (skewness: 1.27, s.e. 0.19). Furthermore, there was a second peak of 5.2% of people who used public transportation every time for their trip to work. The remaining 27.4% distribute equally from 4% use of public transportation to 99% use of public transportation. Logarithmic transformations of the raw data did therefore not solve the problematic distribution of the data. Thus, we decided to dichotomize the behavioural data even if we lost a large amount of variation. Participants who never used public transport were coded

as "0", if they made at least one trip using by public transport they were coded as "1".

The habit to choose a car was measured by the *Response Frequency Measure* (RFM) first described by Verplanken and colleagues (1994). According to the theoretical concept of habit as a script-like predisposition to behave in a certain way they developed a method to measure habit which tried to separate the real habitual components from other components confounding habit in the older measures (mostly past behaviour). They confronted their participants with a set of described situations (e.g. visiting a friend in a nearby city, making a weekend trip, going to a pub) and asked to name the travel mode for doing such a trip that first comes to their mind. The situations are so general and so reduced in given information that according to Verplanken et al. (1994) the decision can only be based on existing schemata. The more often "car" is the associated travel mode, the stronger and the more general is the car-choice habit. For a detailed discussion on this measure see Klöckner et al. (2003). We used an edited five-item version of the original RFM which was adapted to fit the sample. That means all items referring to typical activities of students that were the sample of the original study by Verplanken et al. (1994) were replaced with similar activities likely to be undertaken by everybody. The situations we used were "visiting a friend in a nearby city", "a shopping expedition", "visiting a pub in the evening", "going on excursion on a day with fine weather", "shopping the daily consumer needs". We decided not to include the trip to work as one of the five trips because we wanted to measure a *generalized* form of habit. Furthermore, the discussion about how to measure habits shows that the RFM is vulnerable for confounding effects (Klöckner et al., 2003). If the trip to work was included the RFM would have possibly been confounded by nonhabitual components regarding the particular trip we chose as target behaviour. The travel mode mentioned first was recorded and it was counted how often the mode "car" was named. We counted "car" and "motorbike" as "car" because both travel modes are comparable as they both are individual modes of transportation.

Furthermore, motorbike was only named five times. The sum was taken as a measure of habit strength.

The two variables of the Motivation Stage of the NDM (Personal Norm and Social Norm) were also recorded during the personal interview using multi-item scales that had to be answered on a five-point-agreement scale ("agree not at all" coded as 1, "agree slightly" coded as 2, "agree moderately" coded as 3, "agree very much" coded as 4, "agree totally" coded as 5). The personal norm to reduce car use was measured using four items (see appendix). To measure the social norm which is the perceived expectation of significant others we first asked the participants to name three individuals who were important to them. Then they were asked to rate how much they agreed to the statement "Individual X thinks I should use public transport instead of the car for my regular trips" (see appendix). Raw data for both variables was computed as the mean of all items. Due to the skewness of the social norm a logarithmic transformation was done.

## 3. Results

### 3.1. Descriptives

Table 1 displays $N$, mean, standard deviation, minimum, maximum, and Cronbach's $\alpha$ for the calculated multi-item scales. Furthermore it shows $N$, mean, minimum, maximum, and standard deviation for the behaviour index and the habit measure (RFM). Cronbach's $\alpha$ is satisfying for both scales.

The analysis of the socio-demographic data indicates a good fit of our sample with the population of employed people with access to a car in Germany. A total of 63.1% of the 160 participants with behavioural data are male, 36.9% are female. In the German population people who have at least sometimes access to a car are 69.7% male and 30.3% female (Ministerium für Verkehr, Bau- und Wohnungswesen, 2002). The average age of all participants was 38.5 years ($N = 160$; Min = 19 years; Max = 78 years; 0.6% older than 65 years). A total of 16.9% of participants were between 18

Table 1
Descriptive statistics for the multi-item scales, the behaviour index, and habit (RFM)

| | N | M | S.D. | Min | Max | Cronbach's $\alpha$ |
|---|---|---|---|---|---|---|
| Personal norm | 160 | 2.81 | .97 | 1 | 5 | .83 (4 items) |
| Social norm[a] | 156 | .35 | .21 | 0 | .70 | .70 (3 items) |
| Behaviour index[b] | 160 | .34 | .48 | 0 | 1 | — |
| Habit (RFM)[c] | 160 | 2.13 | 1.21 | 0 | 5 | — |

*Notes*:
[a] Transformed.
[b] Percentage of trips to work by public transport of all trips to work.
[c] Car-choice habit.

and 25 years of age (11.7% of the German population with access to a car, Ministerium für Verkehr, Bau- und Wohnungswesen, 2002), 37.5% were 36–40 years old (38.3% of German population with car access), 42.5% were 41–60 years old (35.5% of German population with car access), and 3.1% were 60 years or older (14.5% of German population with car access). Especially the group of older people (60 years and above) is small in our sample because only people with a trip to work were included in this study and work usually ends around the age of 65 in Germany. There is an approximate average income of 2.200–2.250 €. This is slightly below the average income of the western federal states of Germany (2.810 €; Statistisches Bundesamt, 2001) which may be due to structural characteristics of the Ruhr-District.

### 3.2. Testing different forms of integrating habits into the process of norm-activation

To test if car-choice habit is a valuable extension to the evaluation stage of the Model of NDM we calculated two binary logistic regressions with the dichotomized behaviour as dependent variable and PN and SN as predictors. Habit was included as an additional predictor in the second analysis. Table 2 shows the results. Neither SN nor habit contribute to explained variance of travel mode choice behaviour. In contrast, PN is the only significant predictor of behaviour included in our model of the evaluation stage.

To test whether habit moderates the correlation between PN and behaviour we followed the procedure suggested by Baron and Kenny (1986). We dichotomized the car-choice habit and calculated Pearson correlations, Kendall-Tau-b, and Spearman-Rho correlations separately for the groups with weak and strong car-choice habits. Results are displayed in Table 3. The correlations between PN and behaviour are higher when habits are weak. The correlations in the group with a strong habit remain statistically insignificant.

Table 2
Summary of binary logistic regressions of PN, SN, and habit on travel mode choice ($N = 156$)

| Variable | $B$ | S.E. $B$ | $p$ | |
|---|---|---|---|---|
| Model 1 | | | | |
|   Personal norm | .86 | .23 | .00 | |
|   Social norms | 1.42 | 1.07 | .19 | n.s. |
| Model 2 | | | | |
|   Personal norm | .88 | .26 | .00 | |
|   Social norms | 1.45 | 1.08 | .18 | n.s. |
|   Car-choice habit | .03 | .18 | .85 | n.s. |

*Notes*: Cox and Snell $R^2$ = .17, Nagelkerkes $R^2$ = .23 for Model 1; no increase for any $R^2$ in Model 2.

Table 3
Correlation between PN and behaviour in groups with weak and strong car-choice habit

| | Pearson correlation | Kendall–Tau-b | Spearman–Rho |
|---|---|---|---|
| Weak habit ($N = 96$) | .49* | .42* | .49* |
| Strong habit ($N = 64$) | .21 n.s. | .17 n.s. | .20 n.s. |

*Note*: *$p < .001$.

## 4. Discussion

One aim of this study was to push further the theorizing about habit and its role in the process of moral decision-making. What we can conclude from the results of the study is that habit seems to be a highly effective moderator of the relation of personal norms and behaviour. We assume that the automatic activation of a well-learned association between certain stimuli in a situation and a specific behaviour inhibits the processes of moral decision-making during the activation stage. According to Schwartz and Howard (1981) awareness of need is elicited by stimuli of a situation. If these stimuli are used as cues to reproduce a habituated behaviour pattern—which is certainly a very fast process with high priority—they do not have the power to trigger the normative system. By blocking the whole process of norm activation travel mode choice is no longer under the control of the value system. We therefore conceive of two different paths of filling up the gap between situational cues and overt behaviour. If habits are strong the relation will be cut short and travel mode choice occurs according to existing schemata. If habits are weak a more deliberate norm-based decision is possible. If this process occurs frequently it becomes more and more likely that habits take control at least over some parts of the behaviour.

These assumptions have serious implications on interventions on changing travel mode choice. If you plan to change people's decisions for certain travel modes in the domain of frequently made trips it is important to tailor the interventions to different groups of people according to their habit strength. Those with weak habits are more likely to react to norm centred intervention strategies (e.g. commitment strategies) or information strategies (e.g. environmental education). Particularly commitment strategies have proven to create powerful and long-lasting effects on behavioural change (see Homburg & Matthies, 1998). In contrast, those people with strong habits will probably not show any reaction to these strategies targeting the normative path of our model. Before a normative intervention will show any effect it is important to focus these people's

attention to the situational cues and prevent the habits from blocking the attention stage processes. Future research on the interdependence of habit centred and norm centred interventions (does breaking up habits first increase the effect of norm centred interventions?) would focus the discussion about habits to a more application orientated point of view.

The second interesting result of our study is that we could not reproduce the direct influence of habit on behaviour that we had shown in a previous study (Klöckner et al., 2003). Furthermore, even social norms lack significant influence on behaviour. We attribute these findings to the very special situation of trips to work. These trips are so well learned that we assume a specific "work trip"-habit to be activated. However, this specific "work-trip" habit was not measured in our study. We assume that it is independent from the general habit we measured but has a high influence on the formation of this general habit. The specific habit might be so powerful and so highly adapted to the specific situation that the process of norm-activation is totally blocked if habit strength is high. In contrast to the present study, we previously allowed all kinds of activities related to the given trip and therefore only *generalized* habits (and maybe weak specific habits for each trip without the power to block the norm activation process totally) were activated (Klöckner et al., 2003). We understand this general tendency to use a certain travel mode to have only a weak blocking effect than a strong specific one. Thus, it is possible to implement this generalized habit as an independent component *within* the process of moral decision-making. Based on these assumptions we recommend differentiating between certain levels of habits. Highly regular trips like trips to work result in a powerful specific habit. This strong specific habit is active only in the early stages of our model. Trips with more variability like trips to the city centre for shopping activities are more likely to add to a general tendency towards a specific travel mode. This tendency can be called generalized habit but should be conceptualized as a factor adding to the other components rather than as blocking the entire process of moral decision-making like strong specific habits seem to do. However, considering the possible confounding of the RFM with nonhabitual components it is still necessary to think about the improvement of measuring methods.

We explain the missing influence of social norms by assuming that the travel mode choice to work is a domain in which virtually no subjective norms are communicated. Many of our interviewers reported that during informal chats their participants said that they did not know which travel mode significant others thought they should use. At least in Germany it seems unlikely that people try to influence others to change their travel mode on this particular trip. Most people would experience such an attempt to influence as meddling with their personal affairs. People seem to think of trips to work as being under low personal control which makes it inappropriate to interfere with. The personal norm on the other hand refers to the value system of a person. This means it is more difficult to act against this personal norm. Having a personal norm to save the environment and feeling situational pressure to use a car for your regular trip to work may either result in a redefinition of the norm (e.g. limiting the scope of the norm), in compensatory behaviour (e.g. using public transport for all other trips), or in resisting the situational pressure.

An alternative explanation for the missing influence of social norms on behaviour is that personal norm and social norm overlap theoretically. As personal norms are internalized social norms a high correlation is likely if the personal norm has not been changed during the process of integration into the personal value system. However, a significant and independent influence of personal and social norms on behaviour is the more likely the less correlated both variables are. Considering the substantial correlation of personal and social norm ($r = .48$; $N = 156$; $p < .001$) it is very likely that the stronger predictor (personal norm) suppresses the influence of the weaker predictor (social norm). This hypothesis is supported by the finding that social norms have a significant influence on behaviour if personal norms are omitted from the regression equation ($B = 3.15$; s.e. $= .95$; $p = .001$; Cox & Snell $R^2 = .08$; Nagelkerkes $R^2 = .11$).

## Appendix

*Items of the personal norm scale*:

(1) Due to my personal values I feel obliged to use a car as seldom as possible.
(2) No matter what other people do, my own values tell me that it is right to use the bicycle, bus or subway for my regular trips.
(3) Using the environmentally damaging car for my regular trips would be against my personal values.
(4) Due to my own values I feel personally obliged, to use environmentally friendly modes of transportation like the bicycle, bus or subway for my regular trips.

*Items of the social norm scale*:
Please name three people that you are especially close with according to your opinion (Person A, B, C)

(a) Individual A thinks I should use public transport instead of the car for my regular trips.
(b) Individual B thinks I should use public transport instead of the car for my regular trips.
(c) Individual C thinks I should use public transport instead of the car for my regular trips.

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