

MULTIVARIATE RESEARCH STRATEGIES

Festschrift in Honor of Werner W. Wittmann

Edited by
André Beauducel
Bernhard Biehl
Michael Bosnjak
Wolfgang Conrad
Gisela Schönberger
Dietrich Wagener

Laws of Human Behavior: Symmetry, Compatibility, and Attitude-Behavior Correspondence

Icek Ajzen

Psychologists – especially those of us working in the “soft” areas of developmental, clinical, or social psychology – tend to look with envy to the natural sciences. There, phenomena occur with such regularity that the principles developed to describe and predict them can reasonably be termed laws of nature. In contrast, we bemoan the complexity of human behavior and despair of ever being able to explain or predict it with any degree of accuracy. Indeed, precious few principles in psychology are deemed sufficiently strong to merit the designation of a law. There are, however, a few exceptions – perhaps none more prominent than behavior theory’s law of effect. I would like to nominate one other principle for the status of a law, the principle of symmetry in Egon Brunswik’s (1955) lens model, a principle that Werner Wittmann (1988) has championed for many years.

My interest in the symmetry principle derives from my work on the attitude – behavior relation. As is now generally acknowledged, early failures to find strong relations between verbal attitudes and overt behaviors (see Wicker, 1969) can be attributed to the fact that, in these early studies, investigators attempted to predict quite specific behaviors from very general attitudes (Ajzen & Fishbein, 1977; see Ajzen & Fishbein, in press, for a review). For example, in studies on racial prejudice and discrimination, investigators often measured attitudes of white participants toward African Americans and then assumed that these general attitudes would predict whether the participants sign a petition to extend library hours after watching a black or white confederate sign or refuse to sign the petition (Himelstein & Moore, 1963); whether, when given a choice among two white and two black individuals, prejudiced participants would prefer whites over blacks (Rokeach & Mezei, 1966); or whether participants would agree to have their pictures taken with a black person of the opposite sex and to release these pictures for a variety of purposes (De Fleur & Westie, 1958; Linn, 1965). There is reason to doubt that the particular behaviors selected – or for that matter any single behavior – could be representative of racial discrimination,

the broad behavioral domain under investigation. Given the idiosyncratic and non-representative nature of the behavioral criteria, it is hardly surprising that investigations of this kind obtained virtually no evidence for a relation between attitudes and behavior.

In contrast, when the behavioral criterion is broadly representative of the behavioral domain, rather than a single arbitrarily selected action, strong relations between attitudes and behavior are observed. For example, in a study of religiosity (Fishbein & Ajzen, 1974) several instruments were used to assess attitudes toward religion and participants were asked to indicate whether they did or did not perform each of a set of 100 behaviors in this domain. Whereas the general attitudes were typically poor predictors of individual behaviors, they showed strong correlations (ranging from .61 to .71) with an aggregate measure across all 100 behaviors, a measure designed to reflect the general pattern of religiosity.

Symmetry and the Principle of Compatibility

Just as aggregating behaviors produces a criterion that is compatible with general attitudes, it is possible to obtain compatibility for a single behavior by assessing attitudes toward the behavior in question. A single behavior can be viewed as involving an *action* directed at a *target*, performed in a given *context*, at a certain point in *time*. The principle of compatibility (Ajzen, 1988; Ajzen & Fishbein, 1977) requires that measures of attitude and behavior involve exactly the same action, target, context, and time elements, whether defined at a very specific or at a more general level. To the extent that the indicators used to assess attitude and behavior comply with the principle of compatibility, they should correlate highly with each other.

The compatibility principle is but a special case of symmetry in Brunswik's (1955; Hammond, Hursch, & Todd, 1964) lens model. In Figure 1 a hierarchical version of this model is applied to the attitude – behavior relation. On the left side of the diagram, A_T stands for attitude toward a general target, A_B for attitude toward and behavior, and A_{BC} for attitude toward performing a behavior in a given context. On the right side of the lens are the corresponding overt behaviors: B_T is the multi-act aggregate of behaviors with respect to the target, B is an individual behavior toward the same target, and B_C is the individual behavior performed in a given context. The two sides of the lens thus display different levels of generality or aggregation, on the left with respect to attitudes and on the right with respect to behavior. Symmetry is

defined in terms of correspondence in the generality of predictor and criterion, and the degree of symmetry, in turn, determines the expected correlation between measures on the two sides of the lens model. Thus, very general attitudes (A_T) are expected to predict very general, aggregate measures of behavior (B_T), but not individual behaviors performed in a given context (B_C). Conversely, attitudes toward performance of a specific behavior in a given context (A_{BC}) are expected to correlate well with performance of the behavior in question (B_C).

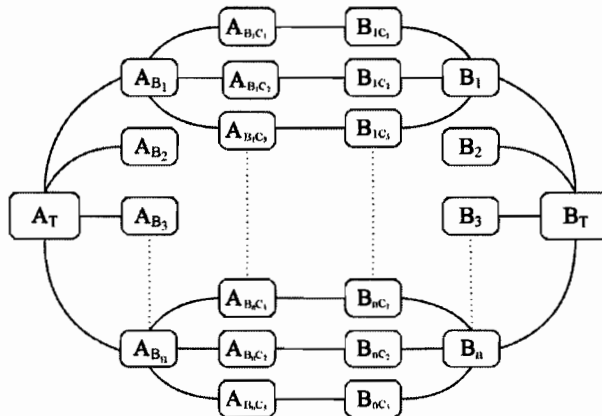


Figure 1: Hierarchical lens model

Symmetry also provides the basis for the contiguity hypothesis in Louis Guttman's (1957; 1959) facet theory. The target, action, context, and time elements of behavioral dispositions can be defined as facets, and their levels of generality constitute facet elements. Like the similarity principle, "The contiguity hypothesis states that the correlation between two variables increases with the similarity between the facet elements defining them" (Guttman, 1957, p. 130).

The similarity or compatibility principle has been broadly applied to many domains, and empirical support for the principle is so strong and consistent as to justify its designation as a law of human behavior. In the attitude domain, a narrative review of 124 data sets (Ajzen & Fishbein, 1977) showed that, as expected, correlations between attitudes and behavior are substantial when these variables are assessed at compatible levels of specificity or generality; when the measures are incompatible, the correlations are very low and usually not significant. The correlation across studies between degree of compatibility and the magnitude of the attitude-behavior relation was found to be .83. However, the most compelling support for the importance of symmetry in attitude-behavior research comes from studies that have directly

compared the predictive validity of attitudes that were compatible (i.e., attitudes toward behaviors) or incompatible (i.e., attitudes toward general targets) with a single-act criterion. In a meta-analysis of eight studies that manipulated level of compatibility (Kraus, 1995), the prediction of behavior from attitude toward the behavior resulted in a mean correlation of .54, whereas the mean correlation between general attitudes and single behaviors was only .13.

The hierarchical structure of the compatibility principle shown in Figure 1 can be extended in the direction of even higher generality by considering broad values that may underlie general attitudes. Because broad values are not directly compatible with general attitudes, we would expect only moderate correlations at best. In other words, the compatibility principle suggests that broad values will account for relatively little variance in attitudes and hence cannot serve as a satisfactory explanation for those attitudes, much less for specific intentions or behaviors. Some support for this expectation is found in an analysis of data from a national survey of attitudes and values conducted in Germany in 2003 (Iser & Schmidt, 2003). On the attitudinal side, the survey assessed racism, xenophobia, antisemitism, homophobia, fear of Muslims, preference for established residents, and sexism. The value scales were taken from Schwartz's (1992) value inventory and included self-direction, universalism, conformity, tradition, power, achievement, and hedonism. In a multiple regression analysis, the seven values in combination explained between 6.2 and 13 percent of the variance in the different attitudes. Individual value-attitude correlations were quite low, ranging from $-.05$ to $.22$.

Belief Congruence

Although the principle of compatibility is empirically well-supported, the mechanism whereby it operates requires further elaboration. That multiple-act aggregates correlate highly with broad measures of attitude is easily explained: Aggregation of behaviors tends to increase the reliability of the resulting index, and it also makes the index more representative and comparable in breadth to a measure of general attitude. This, however, does not explain the high correlations observed when attitude and behavior are each assessed at the level of a single action. Several years ago (Ajzen, 1996; Ajzen & Sexton, 1999) I suggested that belief congruence may help explain the operation of compatibility at the level of individual behaviors. A reasoned action perspective to the prediction and explanation of human behavior (see

Ajzen & Fishbein, 2000) suggests that attitudes as well as behaviors are guided, respectively, by the beliefs that are accessible in the context in which attitudes are expressed and in the context in which behavior is performed. According to the principle of belief congruence, a strong attitude – behavior relation is expected only if the beliefs activated in the two contexts are the same or of equal valence. The predictive validity of attitudes should decline to the extent that the beliefs accessible in the attitudinal context differ from the accessible beliefs in the behavioral context.

Consider, then, the question of compatibility. Under conditions of high compatibility, the measure of attitude is concerned with exactly the same issue or action as the measure of behavior. For example, if applying to the police academy is the behavioral criterion, to maintain compatibility we would have to assess attitudes toward applying to the academy. The considerations or beliefs that are activated in the attitudinal and behavioral contexts are likely to be about the same. In contrast, under conditions of low compatibility, different issues or actions are the focus of attention in the two contexts. Thus, expressing attitudes toward the police (a more general attitude) may bring to mind very different beliefs than considering the possibility of joining the police academy. The resulting lack of belief congruence will tend to produce low correlations between the general attitude and the specific behavior.

This discussion also suggests, however, that compatibility between measures of attitudes and behaviors does not necessarily ensure a strong relation. Even if the two measures involve exactly the same action, target, context, and time elements, activation of different considerations in the attitudinal and behavioral contexts may well reduce belief congruence, resulting in behavior that is inconsistent with the verbally expressed attitude or intention. We shall return to this point below.

Prediction of Specific Behaviors: The Theory of Planned Behavior

If there is one clear conclusion to be derived from work on the attitude – behavior relation it is that general attitudes will usually not provide a good basis for predicting and explaining single behaviors with respect to the attitude object; correlations of single behaviors with general attitudes tend to be modest at best. We can, however, take a different approach to the prediction of specific actions that is consistent with the principle of compatibility. Instead of searching for ways to link general attitudes to specific behaviors, we can focus on the specific behaviors themselves and inquire into the determinants of such behaviors. One of the most popular models to

use such an approach, the theory of planned behavior (Ajzen, 1991), has guided much research over the past 15 years. Virtually hundreds of studies have used the theory successfully in attempts to provide a better understanding of such diverse behaviors as exercising, donating blood, adhering to a low-fat diet, using condoms for AIDS prevention, using illegal drugs, wearing a safety helmet, and choosing a career, among many more (for reviews, see Ajzen, 2001; Armitage & Conner, 2001; Sutton, 1998 – a Web-based list of references can be found at <http://www.people.umass.edu/aizen//tpbrefs.html>). Briefly, according to the theory human action is influenced by three major factors: a favorable or unfavorable evaluation of the behavior (attitude toward the behavior), perceived social pressure to perform or not perform the behavior (subjective norm), and self-efficacy (Bandura, 1977) in relation to the behavior (perceived behavioral control). In combination, attitude toward the behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention. As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived behavioral control, the stronger should be the person's intention to perform the behavior in question. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises. However, because many behaviors pose difficulties of execution that can limit volitional control, it is useful to consider perceived behavioral control in addition to intention. To the extent that people are realistic in their judgments of a behavior's difficulty, a measure of perceived behavioral control can serve as a proxy for actual control and contribute to the prediction of the behavior in question (see Ajzen, 1991). Perceived behavioral control can thus influence behavior indirectly via intentions, and as a proxy for actual control, it can have a direct link to behavior. A schematic representation of the theory is shown in Figure 2.

The three major determinants of a intentions – attitude, subjective norm, and perceived behavioral control – are traced to corresponding sets of behavior-relevant beliefs. Consistent with an expectancy–value model (Feather, 1982; Fishbein, 1963), attitude toward a behavior is assumed to be determined by beliefs about its consequences, each belief weighted by the subjective value of the consequence in question (Fishbein, 1967; Fishbein & Ajzen, 1975). A similar logic applies to the relation between normative beliefs and subjective norm, and the relation between control beliefs and perceived behavioral control. Normative beliefs refer to the perceived behavioral expectations of such important referent individuals or groups as the person's family, friends, teachers, and coworkers.

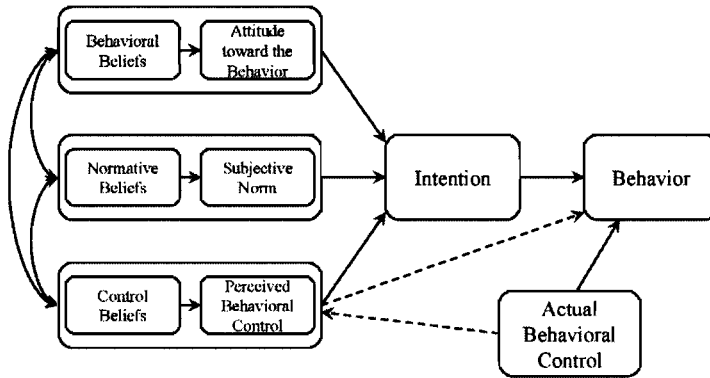


Figure 2: Theory of planned behavior

These normative beliefs – in combination with the person’s motivation to comply with the different referents – determine the prevailing subjective norm regarding the behavior. Finally, control beliefs have to do with the perceived presence of factors that can facilitate or impede performance of a behavior. It is assumed that the perceived power of each control factor to impede or facilitate behavioral performance contributes to perceived control over the behavior in direct proportion to the person’s subjective probability that the control factor is present.

Several meta-analyses of the empirical literature have provided evidence to show that intentions can be predicted with considerable accuracy from measures of attitudes toward the behavior, subjective norms, and perceived behavioral control (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Armitage & Conner, 2001; Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002; Sheeran & Taylor, 1999). For a wide range of behaviors, attitudes are found to correlate well with intentions; across the different meta-analyses, the mean correlations range from .45 to .60. For the prediction of intentions from subjective norms, these correlations range from .34 to .42, and for the prediction of intention from perceived behavioral control, the range is .35 to .46. The multiple correlations for predicting intentions from attitudes, subjective norms, and perceived behavioral control ranged from .63 to .71.

Literal Inconsistency: The Intention-Behavior Relation

Many studies have also substantiated the predictive validity of behavioral intentions. When appropriately measured, behavioral intentions account for an appreciable proportion of variance in actual behavior. A meta-analysis of results from several

prior meta-analyses covering diverse behavioral domains (Sheeran, 2002) resulted in an overall correlation of .53 between intention and behavior (see Ajzen & Fishbein, in press, for a discussion). However, there is also considerable variability in the magnitude of observed relations, and relatively low intention-behavior correlations are sometimes obtained. In fact, it is a common observation that people often fail to act in accordance with their stated intentions. Empirical research on this problem can be traced to LaPiere's (1934) classic study on racial prejudice. A Chinese couple stopped at over 250 restaurants, coffee shops, hotels, motels, and inns while touring the United States and was admitted and received service without hesitation in 95% of the instances; yet in response to a letter of inquiry, 92% of the establishments replied that they would not accept members of the Chinese race.

Many reported cases of inconsistency involve the same asymmetrical pattern of discrepancy between intentions and actions: People express willingness to perform a certain behavior (turn away Chinese individuals in LaPiere's study) but fail to do so. Very few participants in these studies show the opposite pattern, i.e., perform a behavior they did not intend to perform. For example, in an experiment dealing with racial attitudes (Linn, 1965) white female students were asked to indicate their willingness (i.e., intentions) to pose for a photograph with a black male. The photo was to be used for seven different purposes of an increasingly public nature. The proposed uses ranged from psychological research to a racial integration campaign. It was found that approximately 40% of the participants failed to follow through on their intentions to sign the releases. Other examples of failure to carry out expressed intentions can be found in the health domain where it was reported that between 26% and 57% of respondents failed to carry out their intentions to use condoms, to undergo a cancer screening, or to exercise (Sheeran, 2002). Because these cases of literal inconsistency involve measures of intention and behavior that deal with essentially the same specific action, they cannot be attributed to lack of compatibility. Instead, they may be due to a lack of congruity between the beliefs that are activated when intentions are assessed and the beliefs activated when the behavior is performed.

Temporal Stability of Attitudes and Intentions

The simplest and most obvious reason for lack of belief congruence are changes in beliefs that occur after intentions are assessed but before behavior is observed. When such changes take place, the beliefs that are activated at the time of the behav-

ior can differ substantially from the beliefs that were available when the intention was assessed. As a result, the intention-behavior correlation is likely to deteriorate.

The time interval between measurement of intention and assessment of behavior is often taken as a proxy for stability because it is assumed that with the passage of time, an increasing number of events may cause beliefs, and therefore intentions, to change. Empirical research regarding the intention-behavior correlation has demonstrated the expected pattern over time. Thus, in Sheeran and Orbell's (1998) meta-analysis of several previous meta-analyses mentioned earlier, a correlation of $-.59$ was found between effect size (predictive validity of intentions) and amount of time in weeks between assessment of intention and observation of behavior.

Instead of relying on time interval as an indication of stability, some studies have assessed stability of intentions directly, and these studies have consistently found that the intention-behavior correlation declines substantially when intentions are unstable. In one of these investigations (Sheeran, Orbell, & Trafimow, 1999) undergraduate college students twice indicated their intentions to study over the winter vacation, five weeks apart. After returning from the winter vacation, they reported on how many days a week they had actually studied. For participants whose intentions remained relatively stable during the five-week period prior to the vacation, the intention-behavior correlation was $.58$ whereas for participants with relatively unstable intentions, it was $.08$. Similar results were reported with respect to attending a health screening appointment and eating a low-fat diet (Conner, Sheeran, Norman, & Armitage, 2000).

Attitude Strength and Temporal Stability

Much research has shown that the type of information on which an attitude is based can affect its predictive validity. Specifically, attitudes based on direct interaction with the attitude object predict later behavior toward the object better than attitudes based on second-hand information (Fazio & Zanna, 1978; Regan & Fazio, 1977). There is general agreement that the superior predictive validity of attitudes formed under direct experience is due to their greater strength (see Krosnick & Petty, 1995). According to Fazio's (1990; Fazio & Towles-Schwen, 1999) MODE model, the stronger an attitude or intention, the more likely it is that it will be automatically activated and hence be chronically accessible in memory. Furthermore, strong attitudes are expected to bias perception of the situation and guide behavior. An atti-

tude's degree of accessibility (i.e., its strength) is operationalized by measuring the latency of responses to attitudinal questions: the faster the response, the more accessible the attitude is assumed to be. According to the MODE model, therefore, the advantage of direct vs. second-hand information is attributable to the greater accessibility of attitudes formed under direct experience conditions (Berger & Mitchell, 1989; Fazio, Chen, McDonel, & Sherman, 1982; see Fazio, 1990).

Although this hypothesis has not been directly tested, there is evidence to support the prediction that strong attitudes, i.e., attitudes readily accessible in memory, are better predictors of behavior than less accessible attitudes (Fazio & Williams, 1986; Fazio, Powell, & Williams, 1989 — but see Smith & Terry, 2003 for contrary findings). However, the assumption made in the MODE model that the superior predictive validity of strong attitudes is due to the automatic activation of such attitudes has been challenged. First, priming research has shown that all attitudes are activated automatically, not only strong or highly accessible attitudes (Bargh, Chaiken, Govender, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996). Second, it has been suggested that the magnitude of the attitude-behavior relation may be moderated not by attitude accessibility but by other correlated aspects of attitude strength such as certainty, amount of knowledge, or the attitude's temporal stability (see Eagly & Chaiken, 1993).

The principle of beliefs congruence can help explain the advantage of experience-based attitudes compared to attitudes based on second-hand information. It stands to reason that beliefs formed under direct experience with a behavior differ from those formed on the basis of second-hand information. Specifically, beliefs formed under direct-experience conditions are usually based on more accurate information regarding the nature of the behavior and its consequences because the information is obtained in the course of actually performing the behavior. As a result, these beliefs will undergo little change when a person has the opportunity to perform the behavior on a later occasion. In contrast, because beliefs based on second-hand information are not derived from personal experience, they may be quite inaccurate. For example, when provided with second-hand information about different intellectual puzzles (Regan & Fazio, 1977), participants may misjudge the difficulty, challenge, or interest value of a particular puzzle type. These misconceptions would become apparent later as participants work on the puzzles, leading to a revision in beliefs and attitudes. As a result, attitudes and intentions in the direct experience con-

dition of an experiment would remain more stable than in the indirect experience condition, resulting in better prediction of later behavior.

A conceptual replication of the Regan and Fazio (1977) experiment provides support for this analysis (Doll & Ajzen, 1992). Results of the replication showed that, in comparison to second-hand information, direct experience with different video games raised not only the accessibility of attitudes and intentions toward playing those games but, importantly, also the temporal stability of these attitudes and intentions. A mediational analysis confirmed the expectation that the moderating effect of experience type was due to the greater stability of direct experience attitudes rather than to their enhanced accessibility.

Hypothetical Bias

My current interest in the disparity between intentions and behavior is unrelated to possible changes in intentions. Instead, it originated in the context of contingent value measurement. Contingent valuation is a popular tool for assessing the monetary value of goods not traded in the market place (see Mitchell & Carson, 1989). Respondents in a survey are asked to indicate their willingness to pay for a certain good in a hypothetical or contingent market. The monetary value of the good in question is measured by aggregating these willingness-to-pay judgments in the relevant population. Unfortunately, scores of contingent valuation surveys conducted in recent years have revealed that many factors bias the amount of money participants indicate they would be willing to pay, thus jeopardizing the method's validity (see Hoehn & Swanson, 1988; Mitchell & Carson, 1989, for reviews).

Prominent among recent concerns is mounting evidence for the so-called *hypothetical bias*, an over-estimation of willingness to pay in hypothetical or contingent markets compared to actual payment in otherwise identical real cash markets (e.g., Brown, Champ, Bishop, & McCollum, 1996; Cummings, Harrison, & Rutstrom, 1995). For example, in different conditions of a recent experiment (Brown, Ajzen, & Hrubes, 2003), college students voted in a referendum to contribute \$1, \$3, \$5, or \$8 to a scholarship fund either in a hypothetical or a real payment context. Except for the \$1 condition, in which the proportion of real yes votes exceeded the proportion of hypothetical yes votes by 10%, all other payment amounts revealed the usual hypothetical bias; the excess of hypothetical over real yes votes ranged from 30% in the \$3 condition to 48% in the \$8 condition.

Expressions of willingness to pay in a hypothetical situation can be likened to behavioral intentions (Ajzen & Driver, 1992), and hypothetical bias to the kind of asymmetrical discrepancy between intentions and behavior noted earlier. One explanation for this type of discrepancy was offered by Campbell (1963) who maintained that hypothetical and actual responses are both indicators of the same underlying latent disposition. People with highly positive dispositions would be expected to respond favorably in hypothetical as well as real contexts, while people with highly negative dispositions would be expected to respond negatively in both contexts. The discrepancy between intention and behavior can, according to Campbell, be traced to individuals with moderate dispositions who respond favorably in the hypothetical context but unfavorably in the more demanding real context. The hypothetical bias in this view is more apparent than real, or – in Campbell’s terms – it is a case of *pseudo-inconsistency*.

A second explanation is offered by the principle of belief congruence (Ajzen & Sexton, 1999). The belief-congruence hypothesis suggests that beliefs and attitudes are not invariant across context. Although they contain a stable core, beliefs and attitudes are assumed to be strongly influenced by salient contextual cues. Salient features of a real behavioral situation often activate beliefs about the behavior that are different from the beliefs that are activated in the hypothetical situation in which verbal questionnaire responses are elicited. To explain the intention-behavior discrepancy shown in hypothetical bias one would have to assume that the hypothetical situation activates more favorable or fewer unfavorable considerations than does the behavioral situation. Behavior consistent with intentions would only be expected when beliefs in the two situations are congruent, i.e., when they are the same or at least equally favorable or unfavorable.

In a study designed to test the competing explanations of hypothetical bias (Ajzen, Brown, & Carvajal, 2004), college students in small groups were asked to vote on a referendum to donate \$8 to a university scholarship fund for needy students. Prior to the vote (or, in some conditions of the experiment, following the vote), they completed a questionnaire that assessed the major constructs in the theory of planned behavior: attitude toward voting yes, subjective norm, perceived behavioral control, and intention to vote yes. The group members were then asked to cast their votes. In one condition of the experiment, they voted only in a real referendum, while in a second condition they voted first in a hypothetical referendum and, a second time, in a real referendum. The participants were informed that if a majority of group mem-

bers voted yes, the referendum would pass. In the hypothetical referendum, they were told that nobody would actually have to make the \$8 donation but that they should vote as if the referendum were for real. In the real referendum, they were told that if the referendum passed, they actually would have to donate \$8 to the scholarship fund.

Consistent with past research, the results revealed a highly significant hypothetical bias; the percentage of yes votes was much higher in the hypothetical referendum (70%) than in the real referendum (41%). Literal inconsistency was shown by participants who agreed to make a contribution when the question was hypothetical but chose not to make a contribution in the real payment situation. The attitudes, subjective norms, perceptions of behavioral control, and intentions of these participants were compared to those of participants who voted yes in both referenda. The results provided no support for Campbell's hypothesis which would predict relatively moderate dispositions among participants displaying the hypothetical bias pattern. The dispositions of these participants were found to be no less favorable than those of participants who agreed to make a contribution under both payment conditions.

The belief congruity hypothesis was tested by comparing beliefs, attitudes, perceptions of control, and intentions assessed prior to a real referendum with measures of these dispositions prior to a hypothetical referendum. As expected, participants expressed significantly more favorable dispositions prior to the hypothetical than to the real referendum. These findings imply that it can be very difficult for people in a hypothetical context to imagine what they would believe, or how they would feel and react in the real situation. They expect that they would respond in a socially desirable fashion, but once they are in the real behavioral context, considerations are activated that were not readily available in the hypothetical context.

Discussion and Conclusions

As Werner Wittmann has shown with respect to intelligence, work motivation, and other domains of research (e.g., Wittmann, 2002; Wittmann & Schmidt, 2002; Wittmann & Süß, 1997) Brunswikian symmetry is a powerful principle for understanding the relation between attitudes and behavior. Compatibility between measures of attitude and behavior – a special case of symmetry – generally ensures strong correlations. This is true at high levels of generality, where general attitudes are used to predict aggregate measures of behavior, and at lower levels of generality, where attitudes toward a behavior (or behavioral intentions) are used to predict individual

behaviors. The principle of compatibility is an integral part of the theory of planned behavior: Attitudes, subjective norms, perceptions of control, and intentions are all defined, and must all be assessed, at the same level of generality or specificity as the behavior with respect to its target, action, context, and time elements.

An explanation for the powerful role of compatibility with respect to the attitude-behavior relation is provided by the principle of belief congruence. Strong correlations between attitudes and behavior are expected only when the contexts in which attitudinal predictors and behavioral criteria are assessed activate the same or very similar beliefs. This is more likely to be the case for attitudes and behaviors assessed at compatible levels of generality or specificity.

The belief congruence principle can also account for literal inconsistency: a gap between intention and behavior even when measures of these constructs are strictly compatible. Research on the evidential basis of attitudes suggests that the advantage of direct experience can be traced to the fact that attitudes formed under direct experience conditions tend to reflect accurately the beliefs that are activated at the time of behavioral performance. Similarly, research on contingent valuation has shown that overestimates of willingness to perform socially desirable behaviors (i.e., hypothetical bias) can be due to unrealistically favorable beliefs under hypothetical conditions. Because intentions are usually assessed by means of questionnaires in a hypothetical context, they will tend to reflect relatively favorable considerations regarding socially desirable behaviors, much more favorable than the considerations that are activated in an actual behavioral context.

References

- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago: Dorsey Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (1996). The directive influence of attitudes on behavior. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 385-403). New York, NY, USA: Guilford Press.
- Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27-58.
- Ajzen, I., Brown, T. C., & Carvajal, F. (2004). Explaining the discrepancy between intentions and actions: The case of hypothetical bias in contingent valuation. *Personality and Social Psychology Bulletin*, 30, 1108-1121.
- Ajzen, I., & Driver, B. L. (1992). Contingent value measurement: On the nature and meaning of willingness to pay. *Journal of Consumer Psychology*, 1, 297-316.
- Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84, 888-918.
- Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 11, pp. 1-33). Chichester, England: Wiley.
- Ajzen, I., & Fishbein, M. (in press). The influence of attitudes on behavior. In D. Albarracín & B. T. Johnson & M. P. Zanna (Eds.), *Handbook of attitudes and attitude change: Basic principles*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Ajzen, I., & Sexton, J. (1999). Depth of processing, belief congruence, and attitude-behavior correspondence. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 117-138). New York: Guilford.
- Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin*, 127, 142-161.
- 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.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bargh, J. A., Chaiken, S., Govender, R., & Pratto, F. (1992). The generality of the automatic attitude activation effect. *Journal of Personality and Social Psychology*, 62, 893-912.
- Bargh, J. A., Chaiken, S., Raymond, P., & Hymes, C. (1996). The automatic evaluation effect: Unconditional automatic attitude activation with a pronunciation task. *Journal of Experimental Social Psychology*, 32, 104-128.
- Berger, I. E., & Mitchell, A. A. (1989). The effect of advertising on attitude accessibility, attitude confidence, and the attitude-behavior relationship. *Journal of Consumer Research*, 16, 269-279.
- Brown, T. C., Ajzen, I., & Hrubes, D. (2003). Further tests of entreaties to avoid hypothetical bias in referendum contingent valuation. *Journal of Environmental Economics and Management*, 46, 353-361.
- Brown, T. C., Champ, P. A., Bishop, R. C., & McCollum, D. W. (1996). Which response format reveals the truth about donations to a public good? *Land Economics*, 72, 152-166.
- Brunswik, E. (1955). Representative design and probabilistic theory in a functional psychology. *Psychological Review*, 62, 193-217.
- Campbell, D. T. (1963). Social attitudes and other acquired behavioral dispositions. In S. Koch (Ed.), *Psychology: A study of a science* (Vol. 6, pp. 94-172). New York: McGraw-Hill.

- Cummings, R. G., Harrison, G. W., & Rutstrom, E. E. (1995). Homegrown Values and Hypothetical Surveys: Is the Dichotomous Choice Approach Incentive-Compatible? *American Economic Review*, *85*, 260-266.
- De Fleur, M. L., & Westie, F. R. (1958). Verbal attitudes and overt acts: An experiment on the salience of attitudes. *American Sociological Review*, *23*, 667-673.
- Doll, J., & Ajzen, I. (1992). Accessibility and stability of predictors in the theory of planned behavior. *Journal of Personality and Social Psychology*, *63*, 754-765.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace.
- Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75-109). San Diego, CA: Academic Press.
- Fazio, R. H., Chen, J., McDonel, E. C., & Sherman, S. J. (1982). Attitude accessibility, attitude-behavior consistency, and the strength of the object-evaluation association. *Journal of Experimental Social Psychology*, *18*, 339-357.
- Fazio, R. H., Powell, M. C., & Williams, C. J. (1989). The role of attitude accessibility in the attitude-to-behavior process. *Journal of Consumer Research*, *16*, 280-288.
- Fazio, R. H., & Towles-Schwen, T. (1999). The MODE model of attitude-behavior processes. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology*. (pp. 97-116). New York: Guilford.
- Fazio, R. H., & Williams, C. J. (1986). Attitude accessibility as a moderator of the attitude-perception and attitude-behavior relations: An investigation of the 1984 presidential election. *Journal of Personality and Social Psychology*, *51*, 505-514.
- Fazio, R. H., & Zanna, M. P. (1978). On the predictive validity of attitudes: The roles of direct experience and confidence. *Journal of Personality*, *46*, 228-243.
- Feather, N. T. (Ed.). (1982). *Expectations and actions: Expectancy-value models in psychology*. Hillsdale, NJ: Erlbaum.
- Fishbein, M. (1963). An investigation of the relationships between beliefs about an object and the attitude toward that object. *Human Relations*, *16*, 233-240.
- Fishbein, M. (1967). Attitude and the prediction of behavior. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 477-492). New York: Wiley.
- Fishbein, M., & Ajzen, I. (1974). Attitudes towards objects as predictors of single and multiple behavioral criteria. *Psychological Review*, *81*, 59-74.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, *11*, 87-98.
- Guttman, L. (1957). *Introduction to facet design and analysis*. Paper presented at the Fifteenth International Congress of Psychology, Brussels.
- Guttman, L. (1959). A structural theory for intergroup beliefs and action. *American Sociological Review*, *24*, 318-328.
- Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*, *24*, 3-32.
- Hammond, K. R., Hursch, C. J., & Todd, F. J. (1964). Analyzing the components of clinical inference. *Psychological Review*, *71*, 438-456.
- Himmelstein, P., & Moore, J. (1963). Racial attitudes and the action of Negro and white background figures as factors in petition-signing. *Journal of Social Psychology*, *61*, 267-272.
- Hoehn, J. P., & Swanson, C. S. (1988). Toward a satisfactory model of contingent valuation behavior in a policy valuation context. In G. L. Peterson & B. L. Driver & R. Gregory (Eds.), *Amenity resource valuation: Integrating economic with other disciplines* (pp. 149-158). State College, PA: Venture Publishing.

- Iser, J., & Schmidt, P. (2003). Gefährliche Werte? Was Tradition und Konformität anrichten können. In W. Heitmeyer (Ed.), *Deutsche Zustände* (Vol. 2, pp. 61-77). Frankfurt am Main: Germany: Suhrkamp Verlag.
- Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin*, *21*, 58-75.
- Krosnick, J. A., & Petty, R. E. (1995). Attitude strength: An overview. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 1-24). Mahwah, NJ: Erlbaum.
- LaPiere, R. T. (1934). Attitudes vs. actions. *Social Forces*, *13*, 230-237.
- Linn, L. S. (1965). Verbal attitudes and overt behavior: A study of racial discrimination. *Social Forces*, *43*, 353-364.
- Mitchell, R. C., & Carson, R. T. (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington, DC: Resources for the Future.
- Regan, D. T., & Fazio, R. H. (1977). On the consistency between attitudes and behavior: Look to the method of attitude formation. *Journal of Experimental Social Psychology*, *13*, 28-45.
- Rokeach, M., & Mezei, L. (1966). Race and shared belief as factors in social choice. *Science*, *151*, 167-172.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 25. (pp. 1-65). San Diego, CA, US: Academic Press.
- Sheeran, P. (2002). Intention-behavior relations: A conceptual and empirical review. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 12, pp. 1-36). Chichester, England: Wiley.
- Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology*, *29*, 1624-1675.
- Smith, J. R., & Terry, D. J. (2003). Attitude-behaviour consistency: The role of group norms, attitude accessibility, and mode of behavioural decision-making. *European Journal of Social Psychology*, *33*, 591-608.
- Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology*, *28*, 1317-1338.
- Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social Issues*, *25*, 41-78.
- Wittmann, W. W. (1988). Multivariate reliability theory. Principles of symmetry and successful validation strategies. In R. B. Cattell & J. R. Nesselroade (Eds.), *Handbook of multivariate experimental psychology* (pp. 505-560). New York: Plenum.
- Wittmann, W. W. (2002). *Work motivation and level of performance: A disappointing relationship?* Paper presented at the XXV International Congress of Applied Psychology, Singapore.
- Wittmann, W. W., & Schmidt, J. (2002). *A multi-aspect approach to the evaluation of outcome quality in psychosomatic treatment*. Paper presented at the Workshop Quality Management and Outcome Monitoring, Stuttgart, Germany.
- Wittmann, W. W., & Süß, H.-M. (1997). *Challenging g-mania in intelligence research: Answers not given, due to questions not asked*. Paper presented at the International Society for the Study of Individual Differences, University of Aarhus, Denmark.