

The meta-analysis is part of my dissertation (Chapter 2).

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ON THE THEORY OF REASONED ACTION

Bas van den Putte

## Chapter 2

# REVIEW OF THE THEORY OF REASONED ACTION

### Abstract

A meta-analysis of the theory of reasoned action was performed on the results of 150 independent samples, published between 1969 and 1988. The average correlations between the model components proved to be satisfactory, ranging between .42 and .62. The attitude toward the act and the subjective norm could explain 46% of the variance in the behavioral intention, which in turn explained 38% of the variance in behavior. However, results differed considerably over the studies and some moderators were found. Moreover, evidence is presented that the model should be extended with some external variables, namely, perceived behavioral control, personal normative beliefs, and previous behavior. However, the findings of studies into these variations were mixed and more research into circumstances that influence their effect is necessary.

It is over 20 years since Fishbein proposed an extension to Dulaney's theory of propositional control (Dulaney, 1968). On the basis of experiments on verbal conditioning, Dulaney had developed a model that explained the behavior of his subjects. Fishbein (1967b) reformulated the model for the field of social behavior. In this model, behavior (B) is explained by behavioral intention (BI). In theory, a unity relation exists between behavior and behavioral intention under the assumption that "most actions of social relevance are under volitional control" (Ajzen & Fishbein, 1980, p. 5). In the 1967 version of the model, behavioral intention is determined by attitude toward the act (Act), social normative beliefs (NB), and personal normative beliefs (PNB). Attitude toward the act is a measure of affective feelings toward the act and does not have a cognitive or conative component as in the Yale definition of attitude (Rosenberg & Hovland, 1960). The conative component is measured by the behavioral intention and the cognitive component is measured by the behavioral beliefs. These beliefs about the consequences of performing the behavior (bi) are weighted by the evaluation of these consequences (ei) in order to determine the attitude toward the act. Each social normative belief measures the impression subjects have about how a specific important other person feels about them performing the behavior. These are weighted by the motivation to comply (MC) with each specific referent. The personal normative beliefs are respondents' personal feelings about what they should do, weighted by the motivation to comply with themselves.

Because respondents are usually motivated to comply with themselves, the personal normative beliefs were unweighted in the first published experimental application (Ajzen & Fishbein, 1969). This was the only article that applied the 1967 model. In their subsequent publication, Ajzen and Fishbein (1970) dropped the personal normative beliefs altogether, because they found them empirically indistinguishable from behavioral intention. A last major change to the theory was the addition of subjective norm (SN), that mediates the relationship between normative beliefs and behavioral intention. The subjective norm is a measure of the impression subjects have about how important others in general feel about them performing the behavior. Fishbein and Ajzen first published

the model in this form in their main theoretical work of 1975. They gave elaborate instructions on how to use this Theory of Reasoned Action (TRA) in their more practical book of 1980. The model as it is now commonly known can be described by equations 1, 2, 3, and 4 (see also Figure 1).

$$B = w_1 BI + \epsilon_1 \quad (1)$$

$$BI = w_2 Aact + w_3 SN + \epsilon_2 \quad (2)$$

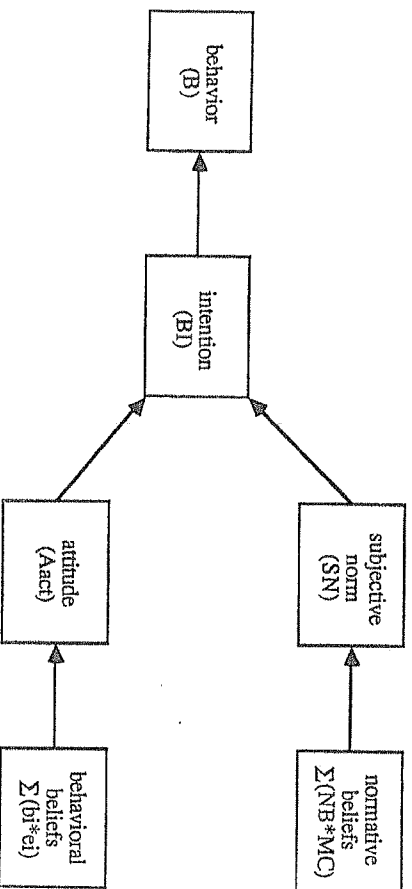
$$Aact = w_4 \sum (b_i * e_i) + \epsilon_3 \quad (3)$$

$$SN = w_5 \sum (NB_j * MC_j) + \epsilon_4 \quad (4)$$

### MODIFICATIONS OF THE THEORY OF REASONED ACTION

A central assumption of the TRA is that the influence of other variables is mediated by the model components. This assumption has been strongly questioned and many model modifications have been proposed over the years. Within the model, most attention has been given to a direct effect of attitude on behavior, bypassing intention. Extending the model, several external variables have been proposed. The most important of these are: perceived behavioral control, personal normative beliefs, and previous behavior or habit.

Figure 1  
The model of the theory of reasoned action



#### Direct effect of attitude on behavior

Over the years, a direct effect of attitude on behavior has received considerable and continuous attention (e.g., Shimp & Kavas, 1984; Wittenbraker, Gibbs, & Kahle, 1983), and several explanations for this effect have been suggested. Manstead claimed that behavior is not entirely caused by intentions but is also influenced by affective factors that are better reflected in the attitude measure (Manstead, Plevin, & Smart, 1984; Manstead, Proffitt, & Smart, 1983). Several authors have claimed that attitude is more likely to have a direct effect on behavior in the case of behaviors that are not entirely under volitional control, but are completely or partly under habitual control (e.g., Bagozzi, Baumgartner, & Yi, 1989; Benthler & Speckart, 1979; Godin, Colantonio, Davis, Shephard, & Simard, 1986). Bagozzi, Yi, & Baumgartner (1990) hypothesized that for more difficult behaviors some planning is required, which makes the formation of an intention to perform the behavior necessary. Bagozzi & Yi (1989) found that only well-formed intentions mediated the effect of attitude on behavior completely.

Unfortunately, many research findings, either supporting or rejecting the direct effect hypothesis, can be explained by statistical artifacts. Bagozzi et al. (1989) showed that after correction for measurement error the direct effect of attitude on behavior which was originally found disappeared. They also showed that the statistical procedures of many studies lacked the power necessary to detect direct effects, even if they were present. Moreover, intentions are often dependent on situational circumstances, whereas attitudes are more stable in time. If behavior is measured some time after submission of the questionnaire, the intention is more likely to have changed than the attitude. Though this changed, but unmeasured, intention still mediates the effect of attitude on behavior, this will not be found for the actual measured intention (Albrecht & Carpenter, 1976; Liska, 1984; Zuckerman & Reis, 1978). Finally, behavior is regularly measured by self-report. Response bias, especially causing a close relation between intention and behavior, cannot be excluded as a possible explanation of the results (Albrecht & Carpenter, 1976; Bagozzi, 1981a, 1982; Fredricks & Dossett, 1983).

#### The theory of planned behavior: Perceived behavioral control

Recently, Ajzen proposed his theory of planned behavior (TPB), which extended the TRA with Perceived Behavioral Control (PBC) to include behavior not entirely under volitional control (Ajzen, 1985, 1987, 1988, 1989, 1991; Ajzen & Madden, 1986; Madden, Ellen, & Ajzen, 1992; Schifter & Ajzen, 1985). In this theory, PBC has a direct effect on both intention and behavior. People who feel capable of performing the behavior will show a stronger intention to do so than people who feel incapable. Similarly, people who feel capable will try harder to actually perform the behavior, causing a direct effect of PBC on behavior. Moreover, if the behavior is not completely under volitional control, PBC will add to the prediction of behavior to the extent that it accurately reflects the actual behavioral control. Fishbein replied that it was premature to modify the TRA before several problems related to Ajzen's proposal were solved, although he admitted that he would like to see the theory extended to non-volitional behaviors (Fishbein & Stasson, 1990).

The TRA has been compared with the TPB by several authors over the past few years. A summary of the results is presented in Tables 1a and 1b. Regarding the prediction of intention, on average the explained variance was increased by 14% if PBC was added to the model (Table 1a). Most striking is the enormous variation in results (Table 1b). The maximum difference in explained variance of intention between the TRA and the TPB was 45% (Netemeyer & Burton, 1990), whereas three studies found no improvement at all (Fishbein & Stasson, 1990; Hinz & Nelson, 1990; Sparks, Heddertley, & Shepherd, 1992).

For behavior, the explained variance increased on average only by 4%. Again, results varied strongly, though in most studies hardly any improvement could be found. The largest increase in explained variance, 28%, was found by Madden et al. (1992). This last study tested several behaviors and sustained the hypothesis that PBC only added to the prediction for behaviors that were low in control. However, taking all the evidence into consideration, there must be some doubt about this conclusion. Occasionally, differing results were found for similar behaviors. For instance, regarding exercising Madden et al. (1992) found an increase in explained variance of 13%, whereas Dzawalowsky, Noble, and Shaw (1990) found one of 0%. More research into the source of variation over the topics seems warranted.

Table 1a  
*Explained variance of intention and behavior for the TRA and modifications of the TRA*

<i>Independent variable added to the TRA</i>	<i>Dependent variable</i>	<i>Average explained variance (R<sup>2</sup>)</i>			<i>Diff</i>
Perceived behavioral control (PBC)	intention	.27	.41		.14
Perceived behavioral control (PBC)	behavior	.17	.21		.04
Personal normative beliefs (PNB)	intention	.55		.58	.03
Previous behavior, habit (PB/H)	intention	.38		.49	.11
Previous behavior, habit (PB/H)	behavior	.26		.60	.34

Table 1b  
*Differences in explained variance of intention and behavior between the TRA and modifications of the TRA*

<i>Independent variable</i>	<i>Dependent variable</i>	<i>Number of studies for which difference in R<sup>2</sup> =</i>				<i>Max. diff.</i>
		.00	.01-.05	.06-.10	>.10	
PBC	intention	3	10	12	12	.45
PBC	behavior	9	18	4	5	.28
PNB	intention	3	9	1	5	.21
PB/H	intention	2	4	8	7	.26
PB/H	behavior	1	1	1	6	.64

*Note.* The method to calculate averages (Table 1a) is explained later in this chapter in the Method section of the meta-analysis. The articles used for the analyses in Tables 1a and 1b are indicated in the References with an "@".  
Comparing the results for the TRA in Table 1a it can be seen that these differed widely over the studies. In the meta-analysis, this result will be enhanced on.

### Personal normative beliefs

Several researchers have reverted to the first form of the theory (Fishbein, 1967b) and tested the role of personal normative beliefs (PNB). Ajzen and Fishbein (1970) omitted these because they found them empirically indistinguishable from behavioral intention (see also Katz, 1982). Schwartz and Tessler (1972) suggested that this was caused by Fishbein and Ajzen's operationalization of PNB, emphasizing a probability assessment. They suggested an alternative that emphasized the sense of moral obligation. Budd and Spencer (1984b) pointed out that Ajzen and Fishbein (1969) themselves showed for two behaviors that attitude had a higher regression weight on intention than PNB, which would be impossible if the last two were identical. PNB were also part of the Triandis model (1977, 1980) and several studies comparing this last model with the Fishbein and Ajzen model found that PNB in particular should be added to the TRA (e.g., Boyd & Wandersman, 1991; Davidson, Jaccard, Triandis, Morales, & Diaz-Guerrero, 1976; Valois, Desharnais, & Godin, 1988). The above criticisms inspired many others to retain the concept. Though most authors concluded that PNB should be added to the model, Table 1a shows that on average it increased the explained variance of intention by only 3%. In most studies the PNB added only little to the explained variance (Table 1b).

Intuitively, PNB is more likely to be influential in moral situations or for altruistic behavior (e.g., Ajzen, 1991; Gorsuch & Orberg, 1983; Pomazal & Jaccard, 1976), but this tendency could not be found in the experiments. Many other explanations for the variation in results over the studies have been offered. Zuckerman and Reis (1978) claimed that PNB is relevant only if people are aware of the consequences of performing the behavior and take responsibility for it. Somewhat contradicting this, Gabrenya and Arkin (1979) found less effect of PNB on intention for people who were more committed to actually performing the behavior. Davidson et al. (1976) hypothesized it is dependent on Social Economic Status. Budd and Spencer (1984b) found a huge difference between men and women for the same behavior. Kashima and Kashima (1988) related it to authoritarianism. Unfortunately, no clear pattern arises from a review of the literature, and little theoretical progress has been made. To conclude, PNB is an important determinant of behavioral intention in some situations, but not in others. Attempts to clarify the nature of these situations have mainly added to the confusion.

### Previous behavior, experience, and habit

Previous behavior, experience, and habit were a final popular addition to the TRA. Ajzen denied the direct influence of previous behavior or experience on future behavior. He claimed that if all determinants of behavior are included in the model, the addition of previous behavior will add nothing once measurement error is taken into account. Previous behavior will often be the best predictor of future behavior, but only if all determinants are stable, and thus behavior is stable (Ajzen, 1991; Beck & Ajzen, 1991). Ajzen admitted that habit is a determinant of behavior that might be added to the TRA (see also Ajzen & Fishbein, 1970). A habit may develop if the same behavior is repeated regularly (Bagozzi, 1981a; Godin, Valois, Shephard, & Desharnais, 1987; Landis, Triandis, & Adamopoulos, 1978). However, it is not the frequency of behavior that is pivotal, but the mental process that directs it. An essential aspect of a habit is that the cognitive process is replaced by an automatic, mindless process (Mittal, 1988).

Wittenbraker et al., 1983). According to this view, intention is not influenced by habit, because that would make it a mindful process (Chang, Piliavin, & Calero, 1988).

Turning to previous behavior, this can have an effect on intention or behavior if the intention of a respondent is unsure or if the target behavior is trivial. Behavioral intentions for this last class of behaviors are not actually formed, and answers in questionnaires can best be interpreted as behavioral expectations based on previous behavior (Bagozzi & Warshaw, 1990, in press). However, it is claimed by other authors that self-report of previous behavior is distorted by self-presentational motives and is reported in accordance with present attitudes and intentions (Budd & Spencer, 1985; Fredricks & Dossett, 1983; Manfreda & Shelby, 1988). Finally, previous behavior or experience can have a direct effect if behavior is not under complete volitional control, but requires extensive effort (Bagozzi, 1982; Bentler & Speckart, 1979; Jaccard, 1975).

Table 1b shows that, again, the empirical results vary widely over the studies, especially concerning the explained variance of intention. However, as expected, the largest increase in this variance, .26, was found for drinking beer in university bars, a relatively common trivial behavior (Budd & Spencer, 1985). The second largest increase, .18, was found for exercising at least twice a week, which requires extensive effort (Godin et al., 1987). The behaviors for which no improvement was found were not trivial or required much less effort, that is, caulking exterior of house and reducing nighttime thermostat setting (Macey & Brown, 1983). On average, the explained variance of intention was increased by 11% if previous behavior or habit was added to the TRA. These variables increased the explained variance of behavior by 34%. However, the variation over the studies, though small, was contrary to expectation. Previous behavior or habit should improve the prediction of behavior if it is trivial, habitual or not under complete behavioral control. However, most improvement, .64, was found by Fredricks and Dossett (1983) for class attendance during summer university. This behavior satisfies neither of the above conditions. Little or no improvement was found for wearing safety belts (Mital, 1988) or eating at fast-food restaurants (Brinberg & Durand, 1983), though good results would be expected in these cases.

Reviewing the results for all modifications, serious doubt can be cast on the assumption of the TRA that the model components mediate the effect of external variables. However, there has been little systematic research into the precise circumstances under which these variables have some influence or into the rationale for their effects, and such findings as there are, tend to diverge. Moreover, statistical artifacts cannot be excluded as explanations for a number of results. The second part of this chapter concentrates on the TRA as described by Ajzen and Fishbein. Two meta-analyses have previously been published (Farley, Lehmann, & Ryan, 1981; Sheppard, Hartwick, & Warshaw, 1988), but these have some shortcomings which the present study seeks to avoid.

## PREVIOUS META-ANALYSES

Farley et al. (1981) investigated 37 tests of the TRA reported in 26 studies. The effect of five moderators on the parameters of equation 2 were tested: whether the direct (i.e.,  $\Delta c$ , SN) or indirect form (i.e.,  $b_{\text{net}}$ ,  $NBJ_{\text{MC}}$ ) of the attitudinal and normative components, respectively, was used; whether the data were gathered in an experiment or a survey; whether the researcher was affiliated with marketing or social psychology; and whether a student or "real world" sample was used. Farley et al. found that only the discipline of the researcher had a significant effect. The number of studies included in this meta-analysis was rather limited, only two of them having been published after 1975. Also, the analysis covered a limited number of moderators and, furthermore, nothing was reported about equations 1, 3, and 4.

The meta-analysis of Sheppard et al. (1988) incorporated 60 articles and concentrated on the effect of the amount of volitional control, the impact of the presence of behavioral alternatives, and the difference between behavioral intention and behavioral expectation. Their meta-analysis supported the relevance of all three moderators, but they restricted the analysis to equations 1 and 2. The main problem with their study is that the coefficients incorporated into the meta-analysis were not independent. The 60 articles analyzed reported on 144 behaviors, but there were only 36 independent groups for equation 1 and 56 independent groups for equation 2. For example, both groups of subjects in a study by Warshaw and Davis (1985b) were included 18 times in the analysis. Secondly, only a small number of studies published after 1980 were incorporated in their meta-analysis.

## THE PRESENT META-ANALYSIS

An extensive literature search yielded only three articles where the model was measured exactly as suggested by Ajzen and Fishbein (1980), and where all relevant statistics were reported as well. In four other articles the model was correctly measured, but not all statistics were reported. Allowing for small deviations from the model, a meta-analysis was performed on 113 articles, containing 150 independent groups. The present selection contained only 11 of the 26 studies included by Farley et al. (1981), mainly because they included many unpublished articles. Of the 60 articles selected by Sheppard et al. (1988), 19 were omitted here because they were unpublished or could not be retrieved. Seven articles did not meet the selection criteria. Besides excluding articles, the present meta-analysis contained 71 articles not selected by Sheppard et al. (1988). More specifically, whereas the latter included only 19 articles published after 1980 in their study, 60 have now been included.

In the analysis phase of the present meta-analysis, the weighted average model parameters were first calculated to see how well the model performed over a large number of studies. After correction for sampling error, the parameters still showed significant variance. The main aim of the study was to identify to what degree characteristics of individual studies influenced the relationships between variables of the model, thus causing this variance.

## Moderators

### External variables

Sufficient evidence has been presented above to show that external variables, that is, variables that are not included in the TRA, can have a direct effect on behavior or behavioral intention. The present meta-analysis will check whether these and other external variables moderate the relationships within the TRA. The central claim of the TRA that external variables have no direct influence on behavior or behavioral intention does not imply that these are unrelated to behavior, only that any relationship is caused by the influence of these variables on other model components. Consequently, although the absolute level of the model components may differ, dependent on external variables, this should not influence the parameters of equations 1, 3, and 4. The relationship between intention and its direct determinants (equation 2) may differ, because external variables can, but will not necessarily, influence the relative importance of the attitudinal and normative components. This is supported by studies on the influence of demographic variables or differences in the topic of research (e.g., Budd & Spencer, 1984b; Cowling, 1973; Kanola, Syme, & Campbell, 1982).

The correlation between intention and behavior should be higher for volitional behaviors compared to less volitional behaviors, because the performance of behavior is impeded in the latter (e.g., Davidson & Jaccard, 1979; Fishbein & Jaccard, 1973; Warshaw & Davis, 1985a). Volitional control should also influence the explained variance of intention, because respondents are often aware of impediments and take this into account when forming an intention. Therefore, for less volitional behavior the intention is affected by more determinants (e.g., the perceived behavioral control) which results in a lower explained variance if the analysis is restricted to the TRA. Sheppard et al.'s (1988) meta-analysis as well as individual studies (e.g., Davidson & Jaccard, 1979) supported these hypotheses. Several moderators that are related to the amount of volitional control will be examined in this meta-analysis, namely, addiction, habit, ability, experience, difficulty of the behavior, and assistance required from other people.

Finally, Warshaw and Davis (1985a, 1985b) considered behavioral expectation to be a superior predictor of behavior because subjects may intend to perform a certain behavior, but expect to fail if they take the amount of volitional control into account (see also Fishbein & Jaccard, 1973). Their studies confirmed these hypotheses, as did the meta-analysis of Sheppard et al. (1988). As behavioral expectation is influenced by many factors besides attitude and subjective norm, Sheppard et al. (1988) found the variance explained by these last two components to be higher for a behavioral intention than for a behavioral estimation measure.

### Measurement of the TRA

Fishbein and Ajzen (1980) made elaborate recommendations for the measurement of their model. The present meta-analysis investigates whether minor deviations from the recommendations influence results, but attention is also given to some specific recommendations. An important issue regularly mentioned by Fishbein and Ajzen is the correspondence in behavioral elements (e.g., Ajzen & Fishbein, 1977). They considered each behavior to consist of four elements: (a) the action being performed, (b) the target at which the action is directed, (c) the context in which the action takes place, and (d) the

time at which the action is performed. Fishbein and Ajzen claimed that it does not matter how many elements are specified, as long as the specification is identical for all model components. The higher the correspondence in these four elements between two variables, the higher the correlation will be (see also Davidson & Jaccard, 1975; King, 1975; Schlegel, Crawford, & Sanborn, 1977).

Fishbein and Ajzen also strongly promoted the elicitation of salient beliefs. Each subject may have many beliefs concerning the performance of a behavior, but the attitude is determined by the salient beliefs only. These can be found by means of a free elicitation procedure. Though the difference between modal salient beliefs and individual salient beliefs has caused some debate (e.g., Kaplan & Fishbein, 1969; Rutter & Bunce, 1989; Thomas & Tuck, 1975), the importance of selecting salient beliefs is generally accepted, as has been shown in applied research (Mazis, Ahlola, & Klippel, 1975).

The order of items in a questionnaire has been found to be of influence in many contexts. For example, Schuman and Presser (1981, pp. 23-77) presented ample evidence that as respondents have a desire to answer consistently, response order can influence the outcome of a study. For many years, this was not shown with the TRA (Ajzen & Fishbein, 1969; Bribberg, 1979; Schwartz & Tessler, 1972), but more recent publications have confirmed the conclusion of Schuman and Presser (Budd, 1987; Budd & Spencer, 1986; Feldman & Lynch, 1988).

Fishbein and Ajzen regularly drew attention to the stability of intentions. For instance, unexpected events can change the intention, and if this occurs between the measurement of intention and the measurement of behavior the correlation will be low. In reality there might still be a large relationship, but the time interval between both measurements hides this. Change is more likely for a larger time interval. This has been shown for voting behavior (Fishbein & Ajzen, 1981a), usage of contraceptives (Davidson & Jaccard, 1979), and infant-feeding methods (Manstead et al., 1983).

An interesting variation in the measurement procedure is the explicit presentation of behavioral alternatives. Even explicitly treating the option of not performing the behavior as a separate behavior with its own consequences might improve prediction and explanation of behavior (e.g., Ajzen & Fishbein, 1969; Prestholdt, Lane, & Mathews, 1987; Smetana & Adler, 1980). Sheppard et al. (1988) found that if behavior involved a choice, the behavior-intention correlation was higher, but it made no difference to the multiple correlation on intention.

A final problem is the difference between the direct measures and indirect measures of the attitudinal and normative components. Many researchers measured only the indirect measures. The direct forms should correlate better with intention, because, if the TRA is correct, the correlation between the indirect form and intention is equal to the correlation between the direct form and intention multiplied by the correlation between direct form and indirect form. However, Farley et al. (1981) found no significant differences.

## Method

### Selection of studies

A computer search would have been ideal, but because the TRA can be applied in many different contexts, no suitable key words were available. Appropriate key words, such as *behavioral intention*, *reasoned action*, or *Fishbein and Ajzen model* were not

listed in the *Thesaurus of Psychological Index Terms*. A central term such as *intention* was not included until 1988. Some searches on titles and abstracts were performed, but *attitude* elicited over 11,000 entries and for *behavior* the number was ten times that. Most of these articles would not have been usable for this review. Combinations of search terms excluded numerous articles. An alternative strategy is to search for articles that cite the major works of Fishbein and Ajzen, that is, Fishbein and Ajzen (1975) or Ajzen and Fishbein (1980). Anyone applying the model would probably refer to at least one of these works. Unfortunately, many others did so too. Again, such a search elicits many articles that are unusable. Therefore, I started with a rather random selection of articles that were readily available. By carefully checking the reference lists of these and the articles thus found, the sample was slowly enlarged.

Originally, it was intended to restrict the meta-analysis to studies that measured the model as Ajzen and Fishbein (1980) suggested, but as only three articles satisfied this criterion, it was necessary to relax the selection criterion somewhat. Allowing models that measured the relationship between intention and beliefs directly (i.e., that did not measure the attitude and/or subjective norm) and models that measured the model only partially (but at least the behavioral intention), yielded 21 articles for meta-analysis.

Therefore, it was decided to include articles that did not exactly follow the measurement recommendations of Fishbein and Ajzen, and to take this into account as a possible moderator effect. For example, articles were included that applied five-point scales (instead of seven-point scales), omitted the motivation to comply, or included more than one scale to measure intention. Strong violations of the measurement recommendations were excluded because it is doubtful whether in these articles it is the TRA that is being measured. This procedure finally resulted in the selection of 113 articles, containing 150 independent samples. These articles are indicated in the References with an "\*".

The selection finally used in this study might not be complete, but is considerably larger than in previous meta-analyses. The 113 articles comprise a good overview of most of the work on the TRA published between 1969 and 1989. Rosenhal (1979) suggested a method to calculate how many studies showing no relationships between the model components at all should be included in the meta-analysis to make the average correlations non-significant at  $p = .05$ . In the present study, this would have been between 147 (for the norm-intention correlation) and 1,260 (for the attitude-intention correlation).

### Ratings of characteristics

In Table 2 the moderators used in the meta-analysis are described. Some of these can be coded relatively objectively, whereas others are of a more subjective nature. For these latter variables, such as amount of volitional control, the correct coding category was not always obvious from the text, but had to be inferred by the coder. In the original coding sheets, a number of moderators had more categories than were eventually used in the analysis. Some categories contained so few cases (e.g., one sample alone consisted predominantly of subjects with low education), that categories had to be combined or omitted to perform a meaningful analysis.

To check coder reliability, a subsample was coded by a second coder. The intercoder correlation between codings of the interval variables was .98. For the nominal or ordinal level variables, the correspondence was estimated by calculating the agreement and kappa

score. For most objective variables, the results were satisfactory (agreement = .86, kappa = .70), but unsatisfying results were found for the subjective variables (kappa < .40). The identical specification of the behavioral elements was also problematic, because for behavior, target, and context only one or two articles did not specify these identically. Only the results for the time element will be reported.

Table 2  
The moderators and their coding categories

Moderators (objective)	Categories	Moderators (subjective)	Categories
Education	High (predominantly college) Mixed (incl. high school)	Behavior	Mainly affective, emotional Rational and/or affective considerations
Sex	Minimum 80% men Min. 80% women	Moral norms	Moral guidance for behavior No moral guidance
Age	Under 20 16-30 20-40	Experience	Little or none Some or much
Topic of research	Health (e.g., smoking, use of drugs/alcohol) Procreation (having children, using contraceptives) Others (e.g., consuming, working, studying, voting)	Habit	Yes, regular behavior No, irregular behavior
		Addiction	Yes, addictive behavior No, non-addictive behavior
Intention measure	Behavioral intention Behav. expectation	Volitional control	Average vol. control Much vol. control
Correct measurement of components	Yes No	Ability of subject	None to average Much
Identical specification of components	Yes No	Difficulty of behavior	Little Average Much
Order of variables	Independent variable first Dependent variables first	Are resources needed	Yes No
Difference score	Yes No	Assistance of others	Yes, at least some needed No, none at all
Time interval (Measurement of behavior)	Measured in questionnaire Immediately after question. At least a day later At least a week later At least a month later At least 3 months later At least a year later		
Elicitation of beliefs	Yes No		

Note. The complete coding instruction can be obtained from the author



Next, another procedure was followed for the subjective variables. An improved coding instruction was developed and all articles were coded again independently by two coders. The intercoder reliability was satisfactory for most variables, but for the most interesting variable, amount of volitional control, kappa was still too low (.37). Therefore, each coder was asked to reconsider the scores that differed, independently of each other. Finally, the remaining differences were discussed between them until complete agreement was reached. It was unfortunate that this last part of the procedure had to be applied, and the results for amount of volitional control should be interpreted with caution.

### Analytical procedures

Not many articles reported only one analysis for one group. Some reported application of the model to more than one behavior of the same group, others to the same behavior for more than one group and some to more behaviors of several groups. To complicate matters further, results have been reported of subgroups as well as of combinations of subgroups, whereas results for some groups were reported in several articles. In order to ensure statistical independence of the dependent variables, every subject should be represented only once. If multiple behaviors for the same group were measured, results for the first measured behavior were used, when this was unreported, the first reported behavior was used. Averaging would be unsound due to the often large variations between behaviors. The average results over behaviors were used if the authors reported only these. Also, the smallest possible groups were included in the study. For example, if results were reported for all students, as well as for men and women within this sample, the results for both sexes were used separately, instead of the aggregated results. Differences between behaviors and between subgroups are moderators in this meta-analysis.

For the meta-analysis, the statistical procedures of Hedges and Olkin (1985, pp. 223-246) were used. First, all coefficients were transformed to Fisher's  $Z$ -score and then the average weighted correlations and regression weights were calculated (Hedges & Olkin, 1985, p. 231, equation 12). It was then checked whether the variance in the parameters could be explained by statistical artifacts. If so, a moderator analysis would be unnecessary, because there was no variance left to be explained. The test statistic for homogeneity of correlations,  $Q$ , was calculated. It has an asymptotic chi-square distribution where the degrees of freedom equal the number of studies minus one (Hedges & Olkin, 1985, p. 235, equation 17). The test is performed at a significance level of .05. The variance of the population correlation was estimated, using the approximate unbiased estimator of the population correlation (Hedges & Olkin, 1985, p. 245, equation 29).

To estimate the effect of the moderator variables on the model parameters analysis of variance was used, where the cases were weighted by the number of subjects minus three (Hedges & Olkin, 1985, p. 241). The number of cases per analysis varied considerably, depending on the parameter and the number of missing values for each moderator. For the analyses of variance, the number of groups per category was variable. No analyses with multiple moderators were performed, because the sample contained too few cases to be divided into many subgroups. Even with one moderator, some categories occasionally contained hardly any cases. The appropriate significance level of the tests is debatable.

Considering the number of tests, a significance level of .05 would be too lenient. The significance level should be divided by the number of tests per moderator. However, not all tests were independent. The model contains five causal relations and, for instance, highly significant correlations with intention for both subjective norm and attitude imply a highly significant multiple correlation. Therefore, for each moderator, the standard level of .05 was divided by the number of independent tests applied.

Outlier analyses were performed, where 10% of the studies was removed (see Hedges & Olkin, 1986, p. 256-257). Results differed only slightly and conclusions were identical

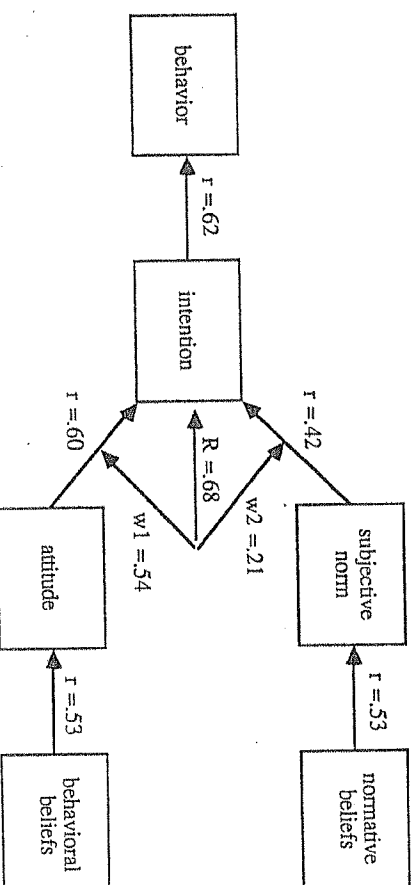
## Results

### Twenty years of the theory of reasoned action

The number of independent groups amounted to 150. However, in most articles, not all statistics were reported. Therefore, the number of independent groups for each statistic was considerably smaller than 150. Figure 2 gives the results where all statistics are weighted averages. Table 3 also contains these results as well as, for each statistic, the number of groups, the number of respondents, the standard deviation, the variance of the population correlation and the test statistic  $Q$  with its critical chi-square value. If  $Q$  exceeds the critical chi-square value, the null hypothesis of equal population correlations can be rejected.

Overall, the relationships within the Fishbein and Ajzen model were reasonably large. For the correlation between attitude and intention, respectively subjective norm and intention, Fishbein and Ajzen predicted that values would depend on the behavior, so the average correlations of .42 and .60 were satisfactory. The average regression weight for

Figure 2  
The results of the meta-analysis on the Fishbein and Ajzen model



Note.  $r$  = correlation coefficient;  $w$  = regression weight;  $R$  = multiple regression coefficient

Table 3  
The results of the meta-analysis on the Fishbein and Ajzen model

Model parameters	N of groups	N of resp.	Mean	s.d.	Population variance	Q	Critical $\chi^2$
Beliefs-attitude corr.	40	7295	.527	.173	.028	311	54.6
Beliefs-norm corr.	37	7191	.534	.187	.033	484	51.0
Attitude-intention corr.	88	12377	.600	.200	.038	1052	109.8
Attitude-intention beta	54	9400	.539	.192	.035	420	71.0
Norm-intention corr.	57	9401	.423	.190	.034	528	74.5
Norm-intention beta	35	5301	.212	.155	.023	113	48.6
Intention-behavior corr.	58	9740	.620	.214	.044	1318	75.6
Multiple R	70	13001	.676	.138	.017	788	89.4

Note. N= number, s.d. = standard deviation, Q = homogeneity coefficient

attitude toward the act (.54) was considerable higher than the average regression weight for the subjective norm (.21), but it will be shown that this differs per behavioral field. The correlations with the beliefs were expected to be high irrespective of the behavior, and their values were reasonable, though far from unity. The average correlation of .62 between intention and behavior was slightly disappointing, because the model expects a unitary relation. The model explained 46% of the variance in the intention, which certainly supports the theory, but leaves plenty of possibilities for improvement. This justifies the addition of extra explanatory variables as proposed by numerous researchers, such as perceived behavioral control, personal normative beliefs, and previous behavior. The results are in line with the results of the meta-analysis by Sheppard et al. (1988), who found an explained variance in intention of 44% and a behavior-intention correlation of .53. Farley et al. (1981) found an explained variance in intention of 50%.

The variance of the estimators was considerable. For all parameters the population variance was substantial and the test statistic for homogeneity, Q, exceeded the critical chi-square value. It is likely that several populations reacted differently to the model. The results are strongly dependent on situational factors. An analysis of possible moderators is therefore justified!

#### Analysis of moderators

A caveat was that, occasionally, for some categories the number of cases was limited, which also might be responsible for the small number of significant results that was found. Nevertheless, it is worthwhile to check tendencies in results. First, if a tendency is shown over the eight parameters, this is based on more cases than for any of the individual parameters, because most researchers reported only some of the parameters. For example, for age the total number of cases that reported on respondents' under 20 was 16, though the highest number for one specific parameter was 9 (Table 4). Second, the aim of this research is to synthesize the maximum amount of information available and a substantial percentage of all studies on the TRA are taken into consideration. With respect to this, large differences are worth checking, even if not significant due to the small N, especially because each study is itself based on many respondents.

#### External variables.

In general, neither education nor sex influenced the results (Table 4). The only demographic variable that seemed to be relevant was age, with older people having higher correlations, especially between intention and its direct determinants. Regarding the research topic, the most interesting results were found when behaviors concerning health and procreation were compared with other behaviors. Health-related behaviors were found to have relatively low correlations for both factors influencing intention. The results on procreation must be formulated tentatively, because the number of cases was relatively small, but it is striking that having children and using contraceptives showed both high attitudinal influence and high normative influence relative to other behaviors. This resulted in a significantly higher multiple correlation coefficient, and the behavioral beliefs also had more influence on the attitude for these behaviors. The same applied to normative beliefs, though here the result was not significant.

A more detailed scrutiny of the different topics (not in table) showed that behaviors concerning voting in elections, work and study seemed to be primarily under attitudinal control (average weights:  $w_2 = .61$ ,  $w_3 = .18$ ), whereas the use of drugs and alcohol was under more normative control (average weights:  $w_2 = .40$ ,  $w_3 = .44$ ).

Table 4  
External variables 1: Demographic variables and research topic

		Corr. beliefs-attitude	Corr. beliefs-norm	Corr. attitude-intention	Beta attitude-intention	Corr. norm-intention	Beta norm-intention	Corr. intention-behavior	Multiple corr.
<b>Moderators</b>									
Education	P	.50	.01	.28	.90	.13	.76	.15	.71
	high m	.51 (.23)	.63 (.19)	.55 (.50)	.50 (.29)	.34 (.33)	.22 (.21)	.50 (.28)	.65 (.35)
	mixed m	.47 (.05)	.42 (.06)	.60 (.12)	.50 (.10)	.43 (.09)	.24 (.03)	.60 (.15)	.64 (.12)
Sex	P	.26	.61	.10	.67	.08	.27	.60	.44
	male m	.53 (.02)	.49 (.03)	.74 (.10)	.62 (.06)	.65 (.03)	.19 (.03)	.64 (.07)	.76 (.08)
	female m	.62 (.10)	.54 (.08)	.66 (.02)	.59 (.10)	.55 (.08)	.35 (.04)	.69 (.12)	.74 (.18)
<b>Age</b>									
under 20 m	P	.12	.002	.0001	.0004	.0001	.57	.31	.0001
	16-30 m	.41 (.03)	.31 (.03)	.52 (.04)	.46 (.07)	.30 (.03)	---	.56 (.06)	.59 (.09)
	20-40 m	.54 (.20)	.66 (.17)	.57 (.46)	.51 (.29)	.36 (.31)	.22 (.21)	.52 (.23)	.66 (.33)
procreation others m	P	.01	.61	.02	.02	.001	.06	.16	.001
	health m	.47 (.18)	.51 (.16)	.53 (.31)	.46 (.15)	.29 (.14)	.29 (.06)	.56 (.22)	.61 (.23)
	procreation m	.72 (.03)	.63 (.03)	.69 (.12)	.64 (.05)	.65 (.03)	.37 (.03)	.68 (.06)	.80 (.07)
others m	P	.56 (.16)	.54 (.16)	.64 (.41)	.58 (.33)	.47 (.36)	.19 (.25)	.67 (.30)	.71 (.39)

Note. The number of independent groups is given in brackets; p is the significance level of the correlation coefficient or F ratio; m is the weighted mean coefficient.

Because the theory of Fishbein and Ajzen assumes that behavior is reasoned, smaller coefficients would be expected for behaviors that are strongly influenced by non-rational factors. However, no significant results were found, though generally the tendency was as expected (Table 5). Behaviors that were strongly influenced by personal norms did not differ from other behaviors, though it was found, as expected, that the regression coefficient between subjective norm and intention was .11 higher for normative behaviors, albeit not significantly. People with little or no personal experience had a higher correlation between attitude and behavioral beliefs than people with more direct experience.

Differences for the other relationships were not significant. Behaviors that were performed regularly out of habit showed no different results. For additive behaviors, a tendency existed towards lower coefficients, which was significant for the correlation between attitude and intention.

The amount of volitional control showed significant differences for the relationship between intention and its determinants (Table 6), but contrary to the meta-analysis of Sheppard et al. (1988), values were lowest for behaviors under most volitional control. It is unclear whether these contrary results are caused by the coding problems in the present research.

Tables 5 and 6 include some variables that are related to the amount of volitional control. Of these variables, experience, habit, and ability showed no significant results. Regarding the difficulty of behavior, a peculiar pattern was found. The relationship between intention and its determinants was smallest for the most difficult behaviors, followed by the easiest behaviors. The relationships were smallest for behaviors that were neither difficult nor easy. Table 6 also shows that if extra resources were needed to perform the behavior, the multiple correlation coefficient was lower. This was not found for the correlation between intention and behavior, which suggests that people are aware of possible impediments when forming an intention, but do not take this into account when formulating their attitude and subjective norm. Even more impediments are present when the help of other people is needed, if more help was needed, relationships were larger.

Finally, again contrary to the meta-analysis of Sheppard et al. (1988), no significant differences were found between behavioral intention and behavioral expectation for their correlation with behavior. In fact, the tendency was contrary to expectations. Also, the variance explained by attitude and norm did not differ for intention and expectation.

#### Measurement of the TRA

Many small deviations from the measurement recommendations of Fishbein and Ajzen were possible. As these were infrequent, the analysis was restricted to two categories: completely in accordance with the recommendations of Ajzen and Fishbein (1980), or any small deviation from them. Except for the regression coefficient between subjective norm and intention, correct measurement always led to larger relationships, though in most cases the difference was not significant (Table 7). The non-significance might be due to a restricted variation in the measurement procedure. No article that strongly deviated from the measurement recommendations was selected for the meta-analysis. Identical

Table 5  
External variables 2: Moderators related to model modifications

		Corr. beliefs- attitude	Corr. beliefs- norm	Corr. attitude- intention	Beta attitude- intention	Corr. norm- intention	Beta norm- intention	Corr. intention- behavior	Multiple corr.
<i>Moderators</i>									
Behavior	P	.33	.03	.05	.16	.85	.15	.83	.12
	p	.50 (14)	.44 (13)	.56 (40)	.48 (17)	.42 (21)	.27 (12)	.61 (18)	.63 (23)
addictive	m	.55 (24)	.59 (20)	.64 (44)	.55 (37)	.43 (32)	.19 (23)	.62 (40)	.69 (45)
rational	m								
Norms	P	.09	.61	.09	.39	.07	.11	.16	.27
	p	.51 (37)	.54 (32)	.59 (72)	.53 (43)	.41 (47)	.23 (28)	.60 (47)	.67 (53)
yes	m	.62 (03)	.48 (03)	.69 (14)	.58 (11)	.54 (08)	.12 (07)	.71 (10)	.71 (15)
no	m								
Experience	P	.01	.07	.70	.37	.77	.53	.04	.60
	p	.75 (05)	.66 (05)	.63 (13)	.51 (13)	.46 (11)	.23 (08)	.78 (06)	.67 (15)
little or no	m	.48 (08)	.47 (09)	.60 (32)	.56 (20)	.49 (19)	.19 (11)	.53 (19)	.69 (23)
some/much	m								
Habit	P	.30	.49	.12	.35	.89	.58	.26	.73
	p	.51 (26)	.54 (24)	.58 (55)	.55 (33)	.45 (34)	.22 (20)	.66 (36)	.68 (44)
yes	m	.56 (12)	.49 (11)	.65 (28)	.50 (16)	.46 (17)	.19 (11)	.58 (17)	.67 (22)
no	m								
Addiction	P	.31	.18	.009	.012	.06	---	.86	.05
	p	.51 (08)	.48 (08)	.49 (11)	.46 (06)	.29 (06)	---	.64 (07)	.63 (08)
yes	m	.56 (29)	.58 (26)	.63 (64)	.58 (45)	.45 (47)	.20 (33)	.62 (49)	.71 (56)
no	m								

Note. Abbreviations as in Table 4

Table 6  
External variables 3: Moderators testing variables concerning volitional control

		Corr. attitude- intention	Beta attitude- intention	Corr. norm- intention	Beta norm- intention	Corr. intention- behavior	Multiple corr.
<i>Moderators</i>							
Volitional control	P	.00	.01	.00	.86	.39	.001
	p	.74 (13)	.63 (11)	.59 (10)	.20 (09)	.68 (11)	.76 (13)
average	m	.55 (44)	.52 (38)	.36 (36)	.21 (24)	.61 (35)	.66 (47)
much	m						
Ability	P	.36	.07	.19	.02	.80	.48
	p	.54 (04)	.48 (06)	.66 (01)	.48 (01)	.64 (05)	.65 (06)
no-average	m	.61 (79)	.57 (43)	.42 (54)	.19 (30)	.62 (50)	.68 (58)
much	m						
Difficulty	P	.00	.02	.002	.61	.02	.00
	p	.53 (40)	.50 (30)	.39 (23)	.23 (16)	.68 (26)	.66 (37)
little	m	.54 (17)	.52 (08)	.31 (13)	.24 (06)	.46 (16)	.55 (14)
average	m	.70 (26)	.62 (16)	.53 (16)	.19 (13)	.63 (15)	.77 (19)
much	m						
Resources	P	.01	.14	.23	.28	.50	.003
	p	.54 (48)	.51 (26)	.37 (21)	.24 (15)	.65 (23)	.62 (34)
yes	m	.65 (40)	.57 (28)	.44 (36)	.19 (20)	.60 (35)	.72 (36)
no	m						
Assistance	P	.005	.997	.001	.001	.60	.28
	p	.68 (16)	.51 (09)	.60 (08)	.39 (07)	.55 (06)	.71 (11)
yes	m	.54 (67)	.51 (42)	.35 (45)	.19 (26)	.62 (48)	.66 (55)
no	m						
Expectation	P	.66	.73	.94	.90	.41	.85
	p	.59 (44)	.48 (29)	.41 (27)	.25 (18)	.66 (27)	.66 (37)
intention	m	.56 (27)	.50 (12)	.40 (17)	.24 (07)	.60 (16)	.65 (12)
expectation	m						

Note. Abbreviations as in Table 4

specification in the question wording of the time element generally led to larger relationships. The order of measurement of the model components was of no importance.

Contrary to the results of Sheppard et al. (1988), the use of difference scores between two alternative behaviors did not significantly affect results. Note, however, that although few articles reported this method, those that did so consistently produced better results. Table 7 shows the results for studies where both components were measured using difference scores. Similar results were obtained if this was only required for one component, irrespective of the other. Articles that reported only the direct or indirect measure were analyzed separately from articles that reported both measures, because in the last group measures were not independent. For the first group of articles (called group 1 in Table 7), a significantly better correlation between intention and the normative component was unexpectedly found for the indirect form. For the attitudinal component and the multiple correlation coefficient the differences were non-significant in the expected direction. For those articles that reported the relationship between intention and both measures (called group 2), an analysis of variance could not be used because the assumption of independence was violated, but the results were more or less analogous to those for group 1.

Because they concern only one or two parameters, the following results are not shown in Table 7. If behavior was measured in the questionnaire itself, actually the previous behavior was measured. A consistency drive would probably influence the behavioral intention and increase the correlation, but no differences were found. However, in line with expectations, the average correlation was non-significantly .16 higher if the behavior was performed and measured immediately after submission of the questionnaire. The longer the time interval between measurement of intention in the questionnaire and measurement of the behavior, the lower the correlation was expected to be; however, this hypothesis was not supported.

Without elicitation of salient beliefs, the correlation was .50 between attitude and behavioral beliefs, and .40 between subjective norm and normative beliefs. With elicitation, both correlations increased to .56, but the differences were not significant.

### Discussion

The results of this meta-analysis support the ability of the TRA to predict and explain behavior, though relations certainly are not perfect and there is considerable variation over the studies. The correlation between intention and behavior is slightly disappointing. Fishbein and Ajzen (e.g., 1975) expected this relationship to depend on: (a) the stability of intention, depending on the occurrence of unexpected events and on the dependence on other people or events; (b) equal specificity of question wording for both components; and (c) amount of volitional control, depending on, for example, ability or habit. As far as these moderators could be tested, no significant results were found. Therefore, Fishbein and Ajzen's suggestions do not explain the disappointing result. Rather, the small explained variance of 38% in behavior indicates that the model probably needs elaboration. Depending on the topic of research, various other variables besides intention might improve the prediction.

There was considerable variance between studies in the relationships within the model, which can only be partially explained by the tested moderators. In general, most

Table 7  
Measurement of the theory of reasoned action

Moderators		Corr. beliefs-attitude	Corr. beliefs-norm	Corr. attitude-intention	Beta attitude-intention	Corr. norm-intention	Beta norm-intention	Corr. intention-behavior	Multiple corr.
Correct measurement									
yes	p	.09	.27	.10	.01	.0003	.35	.09	.06
	m	.57 (10)	.58 (08)	.63 (42)	.61 (20)	.50 (31)	.19 (20)	.67 (27)	.74 (22)
no	p	.49 (28)	.50 (26)	.57 (43)	.50 (29)	.32 (23)	.24 (13)	.56 (29)	.65 (25)
	m								
Identical specification of time									
yes	p	.87	.04	.0005	.002	.01	.001	.85	.95
	m	.54 (13)	.50 (13)	.69 (34)	.60 (25)	.48 (27)	.16 (21)	.64 (34)	.72 (29)
no	p	.53 (06)	.70 (06)	.51 (19)	.46 (13)	.20 (04)	.35 (05)	.61 (05)	.71 (01)
	m								
Order indep. first dep. first									
yes	p	.94		.05	.75			.24	
	m	.56 (07)		.64 (11)	.62 (07)			.60 (41)	
no	p	.55 (05)		.24 (05)	.66 (03)			.77 (02)	
	m								
Diff. score									
yes	p	.03	.15	.13	.80	.19	.40	---	.19
	m	.80 (02)	.79 (02)	.82 (02)	.64 (02)	.60 (03)	.28 (02)	---	.85 (02)
no	p	.57 (10)	.58 (08)	.63 (42)	.61 (20)	.50 (31)	.19 (20)	.67 (27)	.74 (22)
	m								
Group 1									
direct	p			.55	.31	.01	.11	.28	
	m			.57 (70)	.52 (50)	.40 (44)	.23 (30)	.66 (63)	
indirect	p			.54 (18)	.46 (16)	.52 (40)	.30 (34)	.62 (23)	
	m								
Group 2									
direct	p			.66 (18)	.68 (04)	.45 (13)	.16 (05)	.78 (07)	
	m			.45 (18)	.31 (04)	.39 (13)	.29 (05)	.55 (07)	
indirect	p								
	m								

Note. Abbreviations as in Table 4

moderators incorporated in the meta-analysis showed non-significant results. The non-significance of many results might be due to the small number of cases that categories regularly contained. The combined influence of several variables could possibly explain more variance, but then the number of cases per category would be even smaller. Therefore, multivariate analyses were not performed.

### Analysis of moderators

#### External variables

It was shown that, of the individual background variables, only age was relevant in those parts of the model where variation was expected, that is, in the relative importance of the attitudinal and normative factors. Correlations for older subjects tended to be higher, which might be due to their generally wider experience with most behaviors and the possession of more elaborate and stable belief structures. It was also stressed in many articles that the relative importance of the factors is dependent on the topic of research. Indeed, significant differences for different topics were found. Behaviors that require rationality and/or have large personal relevance, such as voting, working, or studying, were primarily under attitudinal control. Behaviors which are performed among friends in a recreational environment, such as the use of alcohol or drugs, were primarily under normative control. The decision to have a child has major consequences for one's

lifestyle, but usually it is not made alone. Therefore, this behavior had high regression weights for both components.

Variables that are suggested as extensions to the TRA did not influence the relationships within the model, with two exceptions. The first exception was the lower correlation between attitude and behavioral beliefs for people with more direct experience, which might be explained by a different retrieval process. People with experience have formed an attitude in the past on the basis of their beliefs and are able to retrieve this directly from memory. Changes in their underlying beliefs are not directly reflected in changes in this attitude. People with no direct experience might form an opinion during the interview on the basis of the cues given by the interview situation, which causes a strong relationship (see Chapter 7).

The second exception is a smaller relationship between attitude and intention for addictive behaviors. For these behaviors, a relatively negative attitude probably exists, but intention is formed in accordance with realistic expectations. In line with this, the intention-behavior correlation hardly differed between addictive behaviors and non-addictive behaviors.

In accordance with the TRA, behaviors that were mainly rational showed better results for most parameters, though not significantly. However, in contradiction with the theory, for behaviors that were under complete volitional control, the relationships between intention and its determinants were smaller. Tentatively, the following explanation is proposed: For behaviors that are under incomplete volitional control, people are more aware of possible impediments and carefully consider all aspects before coming to reasoned answers to the questionnaire items. In this situation, people might also be more aware of the theory being tested and more prone to show consistency. Similarly, results were generally better for more difficult behaviors and behaviors where the assistance of other people is needed. In accordance with these results, Bagozzi et al. (1990) found a stronger mediating role of intention for behaviors that were more difficult to perform, because more planning is required for more difficult behavior.

#### *Measurement of the model*

The claims of Fishbein and Ajzen regarding the measurement of the model were for the most part supported. Authors who followed their recommendations obtained better results for most parameters, though the differences were generally non-significant. Also no significant effect was found for the explicit presence of alternative behaviors in the question wording. Nevertheless, the correlations were on average .18 higher if difference scores were used for both model components. Despite the non-significance, the difference is substantial, and this variation should be considered as an alternative to the classical approach, a conclusion supported by experimental research (see Chapter 3). The non-significance might be due to the small number of articles in which a difference score was actually applied.

The order in which the questions were asked had no influence, though this assumption has been convincingly questioned by Budd (1987), who showed that presenting the questions for three behaviors in random order strongly decreased all correlations. However, attempts to replicate these findings failed (Chapter 7; see also, Ellen & Madden, 1989; Krahné & Six, 1991).

The claim that increasing the time interval between measurement of intention and measurement of behavior decreases their correlation must be rejected on the basis of this meta-analysis, though the correlation was .16 higher if the behavior was measured immediately after the questionnaire, instead of later, again a substantial difference. Measuring the behavior in the questionnaire (i.e., measuring previous behavior) should increase its correlation with intention and measuring actual behavior later should decrease it, but no differences were found.

Also, it was found that the direct form of attitude correlated better with intention than the indirect form, but for the subjective norm the indirect form correlated better. This latter result challenges the validity of the subjective norm. If the effect of the normative beliefs is mediated by the subjective norm, clearly the subjective norm should have a larger relationship with intention. This underlines the repeated statements by several authors, including Fishbein and Ajzen (e.g., 1981b), that more research into the normative factor is needed. Overall, results supported the TRA. Most importantly, the multiple correlation was higher for the regression using direct measures instead of indirect measures.

#### *Comparison with previous meta-analyses*

Only one of the moderators of Farley et al. (1981) was included in the present meta-analysis, yielding similar results. None of the results of Sheppard et al. (1988) were replicated. Most importantly, the results for amount of volitional control and the difference between behavioral expectation and behavioral intention were not reproduced. It was checked whether the present meta-analysis and that of Sheppard et al. differed in the coding of these moderators. For behavioral expectation, the intercoding agreement was .78 and kappa was .64, which is substantial. Most disagreement was caused by articles where either of the meta-analyses coded the moderator as unspecified. If those articles were put aside, the agreement increased to .97 and kappa to .93. It is doubtful that differences in coding can explain the difference in results. More probably this is due to other differences between the two meta-analyses, that is, the far larger number of articles in the present meta-analysis and the multiple use of identical groups by Sheppard et al. In particular, the studies by Warshaw and Davis on behavioral expectation were over-represented in their meta-analysis.

For volitional control, differences in coding can be added to these explanations (agreement = .69, kappa = .23). For almost all differences, the present meta-analysis coded the behavior as mainly volitional, whereas Sheppard et al. did not. Concerned behaviors were, for instance, donating blood at a campus drive, obtaining a swine-flu shot, or eating only non-fattening foods next weekend. Though the present meta-analysis had coding problems on this variable, I am convinced that these behaviors are volitional.

In my view, the coding differences between both meta-analyses are a more likely explanation for the failure to replicate Sheppard et al.'s findings than the coding problems in the present meta-analysis.

### Conclusion

So far, three meta-analyses have been performed on the theory of reasoned action. Therefore, some firm conclusions can be drawn. Differences between the meta-analyses can most likely be explained by the more limited number of studies incorporated in previous meta-analyses, and by their sometimes disputable methodological procedures. Discrepancies between meta-analyses in the same field are not uncommon, and divergent results are regularly reported (Abrami, Cohen, & D'Appollonia, 1988; Steiner, Lane, Dobbins, Schuur, & McConnell, 1991; Wanous, Sullivan, & Malmak, 1989). Nevertheless, taking into account both significant results and similar tendencies in the three meta-analyses as well as the results of individual experimental studies, some consistencies emerge.

All three meta-analyses agree that the theory of reasoned action works satisfactorily for many behaviors. The present meta-analysis found that the relationships between components of the model were reasonably large and 46% of the variance in behavioral intention was explained. Both the present meta-analysis and that of Farley et al. (1981) showed that the relationship with intention is larger for the direct measure of attitude than for the indirect measure, that is, the behavioral beliefs. Though this does not prove causality, it is at least a necessary condition for its hypothesized direction. On the other hand, the relationship with intention was stronger for the normative beliefs than for the subjective norm. Clearly, the subjective norm, which was added last to the model, needs more consideration. Not only is the model of Fishbein and Ajzen supported on the whole, but their measurement recommendations proved valuable also. Those studies that adhered to them tended to show better results. In concurrence with Fishbein and Ajzen's work, individual differences and topic of research can influence the relationship of intention with its determinants. Finally, the application of difference scores might be fruitful.

Overall, these moderators could not explain the considerable variance in relationships over the studies. Furthermore, only 38% of the variance in behavior and 46% of the variance in intention was predicted and explained by the model. Results might be improved by reformulating the relationships within the model and/or adding other explanatory variables, for example, perceived behavioral control, personal normative beliefs, and previous behavior. Though much research into this has been carried out, the accumulated evidence does not give much insight into the specific circumstances under which particular variations might prove fruitful. More systematic research might explain the differences found between studies.

### Footnote

<sup>1</sup>As was realized after completion of the meta-analysis, the value of the correlation between the normative beliefs and the subjective norm as well as the value of the correlation between the behavioral beliefs and the attitude, is dependent on the arbitrary values assigned to the categories of the measurement scale. For instance, the semantic differential can be scored from -3 to +3, or alternatively from 1 to 7. Unfortunately, because not all authors followed the scoring recommendations of Ajzen and Fishbein (1980), this was not included as a moderator in the meta-analysis. Therefore, if included, this moderator might have explained a substantial part of the variance. More information on this topic can be found in Chapter 6.

## Chapter 3

### A COMPARISON OF BEHAVIORAL ALTERNATIVE MODELS

#### Abstract

In Fishbein and Ajzen's theory of reasoned action, behavior is predicted by the behavioral intention, which in turn is determined by a personal attitudinal and a social normative factor. These variables are usually measured with respect to the behavior of interest, ignoring the choice process between behavioral alternatives that precedes the performance of behavior. In any situation, at least two possibilities exist, that is, the choice to act or do nothing. Several methods that take account of this choice process are discussed and empirically compared. It is shown that direct comparisons of behavioral alternatives can be made and that such methods are preferable to both the standard scale and other behavioral alternative models. They improve the predictive value of the model of reasoned action, are efficient in the number of items submitted to subjects and allow for analysis on an interval level.

In most applications of the theory of reasoned action (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975) behavior is predicted by a measure of the intention to perform one specific behavior. In theory, even a unity relation exists between behavior (B) and behavioral intention (BI) under the assumption that "most actions of social relevance are under volitional control" (Ajzen & Fishbein, 1980, p. 5). In turn, intention is explained by the attitude (Aact) and subjective norm (SN) toward performing the behavior in question. The relative importance of these two determinants ( $w_2$  and  $w_3$ ) may differ depending on the topic of research and individual differences. Though the theory of reasoned action contains other components as well, the present study will be restricted to the above, which can be represented by two formulas:

$$B = w_1 BI + e_1 \quad (1)$$

$$BI = w_2 Aact + w_3 SN + e_2 \quad (2)$$

This approach is simple and logical, but it ignores the decision process that precedes the performance of behavior. Subjects choose between alternative courses of action, which should at least include the possibilities whether to act or not. Taking intentions toward each behavioral alternative into account would provide better predictions of behavior. Similarly, taking attitudes and norms toward all alternatives into account would provide better predictions and explanations of intention. As early as 1969, and regularly thereafter, Ajzen and Fishbein discussed this problem (e.g., Ajzen & Fishbein, 1969, 1974; Fishbein & Ajzen, 1981a; Fishbein, Ajzen, & Hinkle, 1980). Since then, some scattered research has been published, in which a number of different approaches were applied, but a systematic comparison of these methods is lacking. In this chapter, several behavioral alternative models are discussed as well as five new experiments that applied these simultaneously, thereby enabling a direct comparison.

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\* indicates articles that have been used in the meta-analysis in Chapter 2  
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