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Directness of attitude measure and speed of information processing as constituents of consumer's attitude behavior correspondence

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Abstract

In general, implicit attitudes are assumed to predict spontaneous or uncontrolled behavior over and above explicit attitudes, but not deliberative or controlled behavior. This may be due to a confound of two factors in the typical measures of implicit and explicit attitudes (e.g., Implicit Association Test vs. rating scale). We argue that these measures can be differentiated on the basis of directness (indirect vs. direct) as well as on the level or speed of information processing involved in the measure (fast vs. slow). Therefore, the attitude-behavior correspondence would depend on the fit between the specific processing components tapped by the attitude measure and the behavior under consideration. In Study 1, we found xxxx. In two studies, we found that deliberative behavior (reading frequency of a newspaper in Study 2 and choice of a DVD player in Study 3) can be predicted by implicit attitudes over and above explicit attitudes, when measured by an indirect but slow procedure (in contrast to an indirect and fast procedure). In Study 4, we found that attitude change can be predicted by an indirect slow measure when it follows a central route of persuasion but not if it results from a peripheral route.

Type of attitude measure and speed of information processing as constituents of consumer's attitude behavior correspondence

Study 1

The goal of our first study was to figure out whether the IAT could be used in measuring implicit attitudes towards writing pads (recycled versus classic white paper) and whether IAT scores are helpful in predicting behavior towards these products. The reasoning behind using recycled and classic white writing pads was the assumption that implicit and explicit attitudes may be dissociated in accordance to the explicit norm of environmental friendly behavior on the one hand side and the implicit preference for paper that appears to be cleaner on the other.

Method

Participants and Design

A total of 40 students (5 male and 35 female, M_{age} = 23.1) of different majors at the University of Heidelberg participated in the study. In an initial talk it was checked if they were familiar with the distinction between classic white and recycled paper. Only those students took part in the study that reported to have prior experiences with both kinds of products. This was done to ensure that participants already had attitudes towards the different writing pads before the study. An equal number of participants were randomly assigned to the four conditions of a 2 x 2 between-subjects design with the factors time pressure (yes vs. no) and task order of the IAT

(see below). As a reward for their participation, participants could chose between different selections of writing sets (with a value of about 3 EURO).

Materials

Explicit attitude. Participants had to judge both recycled and classic white writing pads on seven-point rating scales with respect to top quality, profitable price-performance relationship, high trustworthiness, stability of quality, and looks. These attributes were taken from consumer studies on attitudes and behavior towards corresponding products (Bruhn, 1997). For each of the seven attributes, participants had to judge how well it fits to recycled and classic white writing pads from 1 (*not at all*) to 7 (*perfectly*).

Implicit Association Test. In general, the IAT used in the present study followed the standard version (cf. Greenwald, McGhee, & Schwartz, 1998). However, differences were as follows. The category names were *recycled paper*, *white paper*, *positive*, and *negative* (translated from German). Colored photographs taken from different recycled and classic white writing pads represented the target categories. Two pictures were taken of each of 5 recycled paper and 5 classic white paper writing pads from different perspectives, thus, creating a total of 40 different target stimuli. The exemplars that had to be categorized as positive or negative were direct translations of the words used by Greenwald et al. (1998). From this sample, 20 words with a positive and 20 with a negative meaning have been used. The response assignments in the first combined and the reversed combined task of the IAT procedure (i.e., block 3 and 5) have been manipulated as follows. In block 3, one half of the participants had to press the left key if stimuli were either positive or recycled paper and the right key if they were either negative or white paper (task order A) and the other half had to press the left key if stimuli were either positive or white paper

and the right key if they were either negative or recycled paper (task order B). Key assignments were changed in block 5, respectively.

Choice. Participants could choose between three writing sets as a reward for their participation. They consisted of two pencils and two writing pads that where either both recycled pads, one recycled and one classic white paper pad, or both classic white paper pads. In the time pressure condition, photographs of the three selections appeared on the computer screen and participants had to decide between them via key press within 5 seconds. In the no time pressure condition, the writing sets were presented as real products and participants had unlimited time to make a decision. In both cases, the presentation sequence of the three selections was counterbalanced as follows. For half of the participants the number of recycling pads (0-2) increased from left to right; for the other half the number of recycling pads decreased from left to right.

Procedure

Upon arrival at the laboratory participants were randomly assigned to one of the four conditions resulting from the manipulation of time pressure (yes versus no) and the order within the IAT. At first, they were given the questionnaire containing the explicit attitude measure. After completion, instructions on the computer screen instructed them about the IAT procedure. They were told that positive and negative words as well as pictures of recycled paper classic white paper writing pads would be presented on the screen. Their task was to classify these words by pressing one of two keys (response keys were ‘Y’ and ‘-‘ on German keyboards). Participants were informed that each stimulus would remain on the screen until a correct classification had been performed.

The IAT consisted of five blocks. In the first block, positive and negative words were presented on the screen and had to be classified according to their valence (labels of the categories were “positive” and “negative”). Half of the participants were instructed to press the left key for positive words; the other half was to press the right key for positive words. In the second block, pictures of writing pads appeared and had to be categorized as either being of recycled paper or of white paper (labels ran “recycled paper” and “white paper”). Both blocks, as well as the upcoming fourth block, consisted of 40 trials. The third block (80 trials as well as block 5) constituted the first double discrimination task in which the target and attribute dimensions were combined. Depending on their assignment in the first block, participants shared the same response key for recycled paper and positive words (and therefore the other key for white paper and negative words) or the crossed combination of categories, respectively. In the fourth block, only the attribute stimuli were presented again, but compared to the first block, the assignment of labels toward the response keys was reversed. The last block represented the second double discrimination task. Again, stimuli of both dimensions (pictures and words) had to be discriminated at once. This time, the assignment of the evaluative attribute dimension was reversed, i.e., opposite to the first combined block. Hence, subjects who were to press one key for recycled paper and positive words in the first combined task now did so for recycled paper and negative words and vice versa. This order of response key assignment was balanced between subjects. To control for task-shifting effects (Mierke & Klauer, 2001) stimulus selection alternated between the target and the attribute dimension in the combined blocks.

Having finished the IAT, participants were told that as a gift they could choose between three arrangements of writing sets of equal monetary value. In the time pressure condition, they were shown three photos next to each other on the

computer screen, each depicting a writing set. The order of the photos was counterbalanced as described above. Beforehand, they were told that they had only 5 seconds to make their choice. While they were shown the photos a time bar was running at the bottom of the screen indicating how much time was left. In the no time pressure condition, participants were show the writing sets on a table and they could think about their choice as long as they wanted. Finally, all participants received their chosen arrangement, were thanked and dismissed. The complete study lasted about 20 minutes.

Results

IAT-Scores

Only the latencies of the combined tasks of the IAT procedure are of interest in the present study. Therefore our report is limited to the mean reaction times within these blocks. In consistence with Greenwald et al. (1998), outlier values (1% of all responses) below 300ms were recoded to 300ms and those above 3000ms were recoded to this value. Latencies were log-transformed. The first two trials of each block were dropped. The latencies were subjected to a 2 x 2 (task order x response assignment) ANOVA with response assignment as repeated measurement (see Table 1 for the untransformed means). The ANOVA revealed a main effect for response assignment, $F(1, 38) = 6.25$, $p < .05$ and no other effects (all Fs < 1). Response times of participants were faster when reactions towards positive words and classic white paper (and accordingly towards negative words and recycled paper) shared the same response key than when reactions towards negative words and classic white paper (and accordingly towards positive words and recycled paper) shared the same response key ($M_{\text{white/positive}} = 794$ ms vs. $M_{\text{white/negative}} = 906$ ms). That means, participants implicitly preferred white paper to recycled paper. Task order did

not matter in the present study. Data are, therefore, pooled over these conditions in the following analyses. We also calculated a single difference score for each participant using the reaction times from block 3 and 5 for the following analyses. The difference score (IAT-score) shows good internal consistency (Chronbach's alpha was .96)

Explicit Attitudes

Average attitude scores have been calculated for white and recycled paper products over the seven attribute ratings (Cronbach's alpha was .77) and a difference score was calculated ranging from –3 (preferring recycled paper) to +3 (preferring white paper). On average, participants only slightly preferred recycled to white paper (M = 0.15, SD = 0.98), $t(39) = .10$, ns.

Prediction of Choices

Our main assumption was that implicit attitudes contribute to the prediction of behavior under time pressure but not when time for choices is unlimited. Therefore, regression analyses for ordinal data were conducted for both conditions. Dependent variable was the number of pro recycling choices (0-2). In both cases, we tested a model including implicit and explicit attitude measures as independent variables. In the condition without time pressure, only the explicit attitude (Wald parameter = 3.37, $p < .07$) contributed (marginal) significantly to the prediction of choices , $\chi^2(2, N = 20) = 10.09$, $p < .01$ ($R^2_{\text{Cox \& Snell}} = .40$) . However, when time pressure was installed both the explicit attitude (Wald parameter = 3.93, $p < .05$) and the implicit attitude measured by the IAT (Wald parameter = 4.17, $p < .05$) contributed independently to the prediction of the choices between the three writing sets which included a different number of recycled writing pads, $\chi^2(2, N = 20) = 27.76$, $p < .001$ ($R^2_{\text{Cox \& Snell}} = .75$). This was also evident in a significant gain in explained variance when the implicit

attitude was included in the regression model after the explicit one $\chi^2_{change}(1, N = 20) = 15.17$, $p < .001$ ($R^2_{Cox\ \&\ Snell} = .35$).

To test whether the impact of the implicit attitude on the behavior differed in the two conditions we also calculated a regression model for ordinal data with the following predictors: The condition (no time pressure coded as 0, time pressure coded as 1), explicit, and implicit attitudes plus the interactions term between condition and implicit attitudes (note: the scores for the explicit and implicit attitudes were centered for this analysis). We also included gender of participants and presentation order of the choice options as control variables, for both were related to the dependent variable. Dependent variable was the number of pro recycling choices (0-2). As expected, the interaction between condition and implicit attitude was a significant predictor (Wald parameter = 3.97, $p < .05$) in the model, $\chi^2(6, N = 40) = 43.30$, $p < .001$ ($R^2_{Cox\ \&\ Snell} = .66$). The only other significant predictor was the explicit attitude measure (Wald parameter = 8.70, $p < .05$). We also found a significant gain in explained variance when the interaction between condition and implicit attitude was included in the regression model after the other predictors, $\chi^2_{change}(1, N = 40) = 5.12$, $p < .05$ ($R^2_{Cox\ \&\ Snell} = .05$).

Study 2

The goal of our second study was to figure out whether the different kinds of attitude measures (direct-fast, indirect-fast, direct-slow, indirect-slow) could be differentiated from each other. We were also interested in the differential predictive power of the types of attitudes measures regarding behavior. The attitude objects were two types of newpapers. The „Frankfurter Allgemeine Zeitung“ (FAZ) and the „BILD Zeitung“ (BILD). The first is a more serious newspaper, the latter a tabloid. Thus, we expected a dissociation between the attitudes if measured by the different measures.

Method

Participants and Design

We recruited 112 people (80 female, 30 male; 76 students of psychology, 29 students of different fields, 5 no students[1]) at the University of Heidelberg as participants for this study, for which they received either 8 € or partial course credit in return. Participants were between 19 and 52 years of age (*M* = 22.82). The study lasted for each participant about 1½ to 2 hours. Participants received either 8 € or course credit in return for their participation. This study was solely correlational, i.e., no variables were manipulated and all participants received the same material in the same order as described below.

Materials

Direct-fast measures

Speeded attitude question. The idea to let participants answer an explicit or direct question regarding their attitude under time pressure was used for example by Wilson, Lindsey, & Schooler (2000). In our study participants were sitting in front of a

PC and were asked directly to state their attitude towards BILD and FAZ (“How much do you like the BILD / FAZ?”). They could indicate their answers on the screen using a scroll-bat ranging from –50 (“I do not like it at all”) to +50 (“I do like it very much”), but had only limited time (5 seconds) to do so. Participants were told that they had to give their answer within a limited time frame prior to answering the questions. The remaining time for each question was visualized on the screen through a decreasing time-line.

Fast-gripping board. The Fast-gripping-board has its origin in marketing research. Participants have to decide between two or more alternative objects by gripping one of the given objects with their hand. They are instructed to do so within a certain time frame. This procedure allows to measure different dimensions of products (e.g., the monetary value or the valence; cf. Salcher, 1995). The fast-gripping-board we used in our study looked like a big wooden file folder, lying in front of the participants in a closed state. Inside this “folder” there were two current issues of each the BILD and FAZ. The issue of the BILD was always positioned on the right hand side; the issue of the FAZ was positioned on the left hand side. The experimenter told the participants that he would open the fast-gripping-board and that their task would be to take that newspaper which they liked best. Participants were told that they would only have three seconds for this task. After opening the board, the experimenter counted down the seconds from three to one. After that the board was closed again by the experimenter. Two things were measured: The actual choice of the participants (the newspaper that was first gripped by participants) and the time it took them.

Indirect-fast measures

Implicit Attitude Test (IAT). In general, the IAT used in the present study followed the one used on the first study. However, differences were as follows. The category names were BILD, FAZ, negative, and positive (translated from German). Cutouts of colored photographs of the front page of each newspaper represented the target categories. Ten different cutouts were presented twice in each respective block, thus, creating a total of 40 different target stimuli. The exemplars that had to be categorized as positive or negative were the same as above. The response assignments in the first combined and the reversed combined task of the IAT procedure (i.e., block 3 and 5) was the same for all participants. In block 3, participants had to press the left key if stimuli were either negative or BILD cutouts and the right key if they were either positive or FAZ cutouts. In block 5, participants had to press the left key if stimuli were either negative or FAZ cutouts and the right key if they were either positive or BILD cutouts.

Single Target IAT(ST-IAT). The ST-IAT we used in this study was constructed following a version presented by Wigboldus (2003). The goal was to alter the standard IAT in a way that it would be possible to measure attitudes towards only one category or attitude object. To achieve this, only items from one category of the target-dimension are presented (e.g. cutouts from BILD). In the double discrimination blocks the reaction to stimuli from this category are on the same response-key as the positive category in one block and with the negative category in a second block. We used one single-target-IAT for each of the newspapers (BILD and FAZ). The stimuli were the same as in the IAT. But for each evaluative category we used the words “miracle” and “evil” as additional stimuli (see below). For the target-category 14 cutouts were used during one block (6 photos were presented once and 4 were presented twice during one block). The response assignments in the first combined

and the reversed combined task of the ST-IAT procedure (i.e., block 2 and 4) was the same for all participants. In block 2, participants had to press the left key if stimuli were either negative or BILD / FAZ cutouts and the right key if they were positive. In block 4, participants had to press the left key if stimuli were either positive or BILD / FAZ cutouts and the right key if they were negative.

Direct-slow measures

Attitude question. Participants were asked to state their attitude towards the newspapers BILD and FAZ. In the instructions prior to that they were told to think well before answering each question. Participants could give an answer to the questions ("Altogether, I like BILD / FAZ …") on a scale ranging from 1 (*not at all*) to 7 (*very much*).

Semantic differential. Participants had to evaluate each newspaper on 23 bipolar scales (adjective pairs) that were built to assess an evaluative dimension (cf. Osgood & Suci, 1955). All of the adjectives used had to relatable to newspapers (e.g., informative vs. uninformative). The evaluations for all adjective pairs were given on a 7-point-scale.

Indirect-slow measures

Error-choice method. This method was developed following a procedure by Hammond (1948). The method was introduced to participants as a knowledge-test. Participants had to answer nine questions for each newspaper. Answers were given on an 11-point scale (e.g., 0% to 100 %). For all of the questions it was unlikely, if not impossible, for participants to know the correct answer. The idea behind this method is that participants have to guess the answers and that their guessing will be biased

in the direction of their attitudes towards the respective attitude object. We asked participants, for example, how many spelling mistakes were in an issue of one of the newspapers. Persons with a positive attitude towards this newspaper should state a lower number than persons with a negative attitude.

Attribute Liking Task (ALT). The authors of this paper developed this indirect method. The method was run on a computer and consisted of two blocks. During the first block, participants had to judge the preferred newspaper of unknown persons. For that reason, 40 black-and-white photos showing the faces of different people were presented in a sequential order. The task for participants was to categorize each picture into one of two groups: BILD-reader and FAZ-reader. In the second block the same photos were presented in a different order. This time, participants had to judge how much they liked each person. They had to indicate their answer on a scale from –50 (*not at all*) to +50 (*very much*). It was expected that participants would use the liking of the persons as a cue when judging the preference regarding the newspapers.

Associative network. This method is based on a method developed by Kirchler and DeRosa (1996). The idea is that people have more positive associations towards objects they have a positive attitude for than towards objects they have a negative attitude for. Participants were asked to associate freely about the objects BILD and FAZ. For each object they could state up to 10 associations. After participants had written down their associations they were asked to rate these associations regarding its valence. They could indicate their judgments on a scale ranging from –2 (*negative*) to +2 (*positive*).

Behavior measure

Participants were asked about their average reading behavior concerning the two newspapers. They could indicate their answer to the question (“How often do you

read the newspapers BILD / FAZ on average?”) by choosing one of 6 categories: “every day”, “2-3 times a week”, “once a week”, “2-3 times a month”, “fewer than that” and “never”. In addition, we asked participants where they normally bought or read their preferred newspaper and which German newspaper they like best.

Procedure

The whole study lasted about 45-60 minutes. Due to organizational reasons, this study was conducted together with two other, unrelated studies. Participants were told that the study was about knowledge and opinions about newspapers. In the beginning participants had to fill out an informed consent sheet. In the following they were confronted with the different attitude measures. The order of the measures was conform to their level of transparency regarding their true intention (i.e., to measure attitudes). Therefore, the indirect measures were presented before the direct ones, whereby the indirect-slow measures were presented before the indirect-fast ones. The only exception was the fast-gripping-board that was used at the very end of the study for practical reasons. The order of the measures was as follows: 1. Error-choice method, 2. ALT, 3. associative Network, 4. IAT, 5. ST-IAT, 6. speeded attitude question, 7. semantic differential, 8. attitude question, 9. fast-gripping board.

The IAT was administered the same way as in study one. The ST-IAT consisted of four blocks. In the first block participants had to discriminate between positive and negative words (evaluative dimension). For each category (positive vs. negative) 21 items were used. The categories were alternating in a random fashion. Altogether, 42 items had to be sorted in this block. The second block was a combined discrimination task. Participants had to respond to items from the categories “BILD” and “negative” with the left response-key and to items from the

category “positive” with the right response-key. Beside the fact that only one target-category was used, there were two more differences to the standard IAT. First, to avoid a strong imbalance between the two responses (left vs. right response-key) during one block, the number of items differed for the categories in the double-discrimination blocks. For the categories that shared one response-key (here “BILD” and “negative”) only 14 items each were used. For the third category (“positive”) assigned to the other response-key 21 items were used in one block . Altogether, 49 items had to be sorted in this block. The second difference was the alternation between the dimensions (target and evaluative). In the standard IAT the items are drawn from the two dimensions in an alternating fashion during the double-discrimination blocks. In the case of the ST-IAT this could lead to anticipation of the correct response by the participants for the items of the target-category. This could then have an influence on the reaction times. To prevent this, the items were drawn from the two categories in a randomly alternating fashion. To keep the task-switching costs constant (cf. Mierke & Klauer, 2001), the same random sequence was used in both double-discrimination block. In the third block participants again had to discriminate items from the evaluative dimension, but with the opposite response-key as before. The fourth block was again a combined discrimination task, but this time the response towards the items of the evaluative dimension was opposite to the second block. Instructions and inter-stimulus intervals were the same as in the IAT described above.

Finally, participants had to answer the questions about their reading-behavior and had to state their age, gender, and field of study. At the end of the study participants were fully debriefed and received their rewards.

Results

Direct-fast measures

Speeded attitude question. A relative score was calculated by subtracting the attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –100 (preferring FAZ) to +100 (preferring BILD). Two participants failed to answer the question within the demanded time frame of five seconds. On average, participants preferred the FAZ to the BILD (M = -49.4, SD = 28.3), $t(109) = -18.33$, $p < .001$.

Fast-gripping board. The scores were based on the reaction times of participants (i.e., time to reach and “grip” one of the newspapers). For the BILD the times were left unchanged, for the FAZ the times were inversed (multiplied with –1). Thus, the final score could range from –3 (preferring FAZ) to +3 (preferring BILD). Eight participants failed to reach for a newspaper within the demanded time frame of three seconds. On average, participants preferred the FAZ to the BILD (M = -0.79, SD = 0.64), $t(103) = -12.65$, $p < .001$.

Indirect-fast measures

IAT. Only the latencies of the combined tasks of the IAT procedure are of interest in the present study. Therefore our report is limited to the mean reaction times within these blocks. In consistence with Greenwald et al. (1998), outlier values (1% of all responses) below 300ms were recoded to 300ms and those above 3000ms were recoded to this value. Latencies were log-transformed. The first two trials of each block were dropped. We calculated a single difference score for each participant using the reaction times from block 3 and 5 for the following analyses.

Positive scores stand for a preference of BILD over FAZ; negative scores for a preference of FAZ over BILD. The difference score (IAT-score) shows good internal consistency (Chronbach's alpha was .91). Three participants had a too high error-rate (> 20 %) and where, therefore, excluded from the analyses. On average, participants preferred the FAZ to the BILD (M = -0.13, SD = 0.15), t(108) = -9.19, p < .001.

ST-IAT. The scores for each of the ST-IATs (for FAZ and BILD) were calculated in the same way as described above for the IAT. The two scores show satisfactory internal consistency (Chronbach's alphas were .76). A relative score was calculated from the difference of these two scores. Positive scores stand for a preference of BILD over FAZ; negative scores for a preference of FAZ over BILD. Eight participants either had a too high error-rate (> 20 %) or failed to complete one or both ST-IATs and where, therefore, excluded from the analyses. On average, participants preferred the FAZ to the BILD (M = -0.07, SD = 0.13), t(103) = -5.71, p < .001.

Direct-slow measures

Attitude question. A relative score was calculated by subtracting the attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –6 (preferring FAZ) to +6 (preferring BILD). Two participants failed to answer the question. On average, participants preferred the FAZ to the BILD (*M* = -3.04, *SD* = 1.59), *t*(109) = -20.02, *p* < .001.

Semantic differential. The original measure consisted of 23 different bipolar scales. In a preliminary analysis we found only a very low internal consistency using

all scales (Chronbach's alphas were below .20). Therefore, we reduced the measure to those scales that were most likely assessing an evaluative dimension towards the newspapers. The final measure consisted of 11 different bipolar scales. The internal consistency was satisfactory this time (Chronbach's alphas were above .57). Mean scores of the 11 scales were calculated for both newspapers. A relative score was calculated by subtracting the mean attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –6 (preferring FAZ) to +6 (preferring BILD). Two participants failed to answer the questions. On average, participants preferred the FAZ to the BILD (M = -0.76, SD = 0.80), $t(109) = -10.06$, $p < .001$.

Indirect-slow measures

Error-choice method. The original measure consisted of 11 questions. In a preliminary analysis we found only a low internal consistency using all scales (Chronbach's alphas were below .37). By excluding one question ("How many of the BILD / FAZ readers buy the respective newspaper on a daily basis?") a more satisfactory internal consistency could be reached (Chronbach's alphas were above .41). Mean scores of the questions were calculated for both newspapers. A relative score was calculated by subtracting the mean attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –10 (preferring FAZ) to +10 (preferring BILD). Two participants failed to answer the questions. On average, participants preferred the FAZ to the BILD (M = -3.39, SD = 1.22), $t(109) = -20.52$, $p < .001$.

ALT. For each participant two mean scores were calculated, based on the sympathy ratings for the individually classified photos as readers of the FAZ or the BILD. Internal consistency could not be calculated, because each participant a

different number and different kinds of photos were classified as FAZ- or BILD-readers. A relative score was calculated by subtracting the mean attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –100 (preferring FAZ) to +100 (preferring BILD). On average, participants preferred the FAZ to the BILD (M = -14.0, SD = 9.85), t(111) = -15.02, p < .001.

Associative network. Scores were based on the evaluative ratings of the associations for the FAZ and the BILD. The internal consistency was satisfactory (Chronbach's alphas were above .47). Mean scores of the ratings were calculated for both newspapers. A relative score was calculated by subtracting the mean attitude-score toward the FAZ from the attitude-score toward the BILD. The final score could range from –4 (preferring FAZ) to +4 (preferring BILD). On average, participants preferred the FAZ to the BILD (M = -1.32, SD = 0.97), t(111) = -14.45, p < .001.

Behavior measure.

Based on the self-reported reading frequency for each newspaper, a relative score was calculated by subtracting the mean frequency of reading the FAZ from the frequency of reading the BILD. The final score could range from –5 (reading FAZ more often) to +5 (reading BILD more often). Eight participants failed to answer the questions. On average, participants read more often the FAZ than the BILD (M = -0.75, SD = 1.02), t(103) = -7.49, p < .001.

Relationships among attitude measures

Bivariate correlations were calculated to examine the relationships among the nine different attitude measures. The correlations are reported in TABLE 1XX. Overall, there are substantial correlations between the different measures of each of

the four categories (direct-fast, indirect-fast, direct-slow, indirect-slow). Both direct-fast measures correlated with r = .40 each other, as did the both indirect-fast measures (r = .25). The two direct-slow measures did not correlate (r = -.02). On of these measures (the semantic differential) did not correlate with any of the other attitude measures (all rs < 13). Therefore, we assume that this measure did not assess attitudes or, at least, the evaluative part of attitudes. In the category of indirect-slow measures, the error-choice method correlated with the other two measures (rs = .30 and .40), which did not correlate with each other (r = .17).

There were also significant correlations between measures across the four categories. For example, the classical attitude question as a direct-slow measure correlated significantly with all measures of the other categories (all rs > .27) except the ST-IAT (r = .05) and the ALT (r = .18). Both direct-fast measures also correlated with two of the indirect-slow measures (rs > .21 with error-choice method; rs > .34 with associative network), but not with the ALT (rs < .09). The IAT as an indirect-fast measure also correlated with one direct-fast measure (r = .22 for the speeded attitude question) and one indirect-slow measure (r = .20 for the associative network). The ST-IAT and the ALT were the only measures that correlating only with other measures within their own category (all other rs < .15 for the ST-IAT and < .19 for the ALT).

Factor analyses

To gain a greater understanding of the relationships among the different attitude measures, we conducted a factor analysis using all nine attitude scores. Principal factors extraction with an oblique (varimax) rotation was performed on the nine scores. We first computed a four-factor solution, for we expected four types of

attitude measures (direct-fast, indirect-fast, direct-slow, and indirect-slow). In total, the four factors explained 69.29 % of the variance. Loadings of variables on factors after rotation and the percentages if variance explained are shown in table 2XX.

The first factor is represented by all direct measures (except the semantic differential), plus at least one of the indirect-slow measures, i.e., the associative network. The error-choice method as another indirect-slow measure also loads on this factor, but to a lesser extent than on factor three. Thus, it may be that the first factor represents the variance captured by classical direct attitude measures. For participants were confronted with so many different measures and repeatedly with the concept of the two newspapers, this may have had two effects. On the one hand, some of the indirect measures were not so unobtrusive as expected. On the other hand, the attitude concepts were probably activated throughout the whole study, diminishing the differences between the (direct-)fast and (direct-)slow measures. The IAT and the ST-IAT loaded highly on the second factor, which may, therefore, represent the category of indirect-fast measures. The third factor was represented by the ALT and – at least partially – by the error-choice method, two of the three indirect-slow measures. Finally, the fourth factor was defined by a single variable, the semantic differential.

We additionally compared the four-factor solution with a three-factor solution. The three-factor solution explained 59,22 % of the variance, i.e., 10 % less than the four-factor solution. Again, the first factor represented all direct-fast and direct-slow measures – except the semantic differential – plus the associative network and part of the error-choice method as two indirect-slow measures. The IAT and the ST-IAT loaded on the second factor, as did the semantic differential. The third factor was represented by the indirect-slow measures, i.e., the ALT and part of the error-choice method. The semantic-differential also loaded negatively on this factor.

Taken together, the factor-analyses suggest that we found at least three different types of measures, which may be interpreted as direct (-slow), indirect-slow, and indirect-fast. Direct (-slow) attitude measures were the classical attitude question together with the speeded attitude question, the fast-gripping board, and the associative network. The ALT can be seen as an indirect-slow measure, whereas the error-choice method is somewhere between these two categories (indirect- and direct-slow). Both reaction time measures, the IAT and the ST-IAT, can be seen as indirect-fast measures. The semantic differential seemed to not have measured the same construct as all other measures.

Prediction of behavior

We also investigated the predictive power of the different measures for the self-reported reading-behavior. Since this was a slow measure, i.e., participants had ample time to answer the questions about their reading-behavior; we expected that all (direct and indirect) slow attitude measures should predict this behavior. The other (direct and indirect) fast attitude measures should not predict the self-reported reading-behavior. The correctional together with the factor-analyses suggested that none of the measures belonged to the category of direct-fast measures. Still, we had at least one measure for each of the other three categories. The following analyses are based on the category-structure as suggested by the factor-analyses.

In a first analysis we looked at the single-order correlations of the attitude measures with the self-reported reading-behavior (see table 3XX). As expected, there were significant correlations for all direct-slow measures (all *r*s > .38) and also for the two indirect-slow measures (*r*s > .30). The two indirect-fast measures did not correlate with behavior (*r*s < .17) as well as the semantic differential (*r* = .06)

To further investigate the independent predictive power of the different attitude measures, we conducted two multiple regression analyses. In a first analysis we used all nine attitude measures as predictors and the self-reported reading-behavior as criterion. The overall model explained 38 % (R = .62, p < .001) of the variance of the behavior. In this model, the best single predictors were the ALT (stand. Beta = .24, p < .05), the fast-gripping board (stand. Beta = .22, p = .05), and the semantic-differential (stand. Beta = .17, p = .07). All other variables did not significantly predict a unique part of the variance of the behavior (all stand. Beta < .18, ps > .11).

In an additional hierarchical multiple regression analysis we wanted to test whether the two indirect-slow measures could predict behavior independently and above the other measures, especially the direct-slow measures. In a first step, we included the four direct-slow measures. These measures already explained 28 % (R = .53, p < .001) of the behavior. In a second step, we included the two indirect-fast measures. These measures improved the prediction of the model by 2 % (R_{Change} = .02, p = .42), an insignificant change. We also included the semantic differential in a third step. This measure improved the prediction of the model by another 2 % (R_{Change} = .02, p = .10). Finally, we included the two indirect-slow measures into the model. These two measures improved the explained variance in the behavior by 6 % (R_{Change} = .05, p < .05), a significant change. Thus, the indirect-slow measures could explain variance in slow-behavior measure uniquely and above all other attitude measures we used.

Results and Discussion

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General Discussion

The un-confounding of directness of measure (direct vs. indirect) and speed of information processing (fast vs. slow) in accordance with Vargas (2004) has some validity.

Deliberative consumer behavior can be predicted by indirect-slow measures over and above direct-slow measures (in contrast to indirect-fast measures)

Therefore, more attention should be drawn to the development of indirect-slow measures of (implicit) consumer attitudes

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Table 1

Typical Implicit and Explicit Attitude Measures by Directness of Attitude Measurement and Speed of Information Processing

	Speed	
Directness	Fast	Slow
Direct		Rating Scale
Indirect	IAT	

Table XXX. Intercorrelations among the different attitude measures.

Measure	1	2	3	4	5	6	7	8	9
Direct-Fast									
1. Explicit-Fast	—								
2. FGB	.40***	—							
Indirect-Fast									
3. IAT	.22*	.16	—						
4. ST-IAT	.06	.10	.25*	—					
Direct-Slow									
5. Explicit-Slow	.67***	.46***	.27**	.05	—				
6. Semantic-Diff	.04	-.04	.04	.13	-.02	—			
Indirect-Slow									
7. Error-Choice	.37***	.21*	.15	.14	.42***	-.09	—		
8. ALT	.08	.03	.18	.15	.18	-.10	.30**	—	
9. Ass-Network	.34***	.34***	.20*	-.02	.52***	-.04	.40***	.17	—

Note. Explicit-Fast = Speeded explicit attitude question; FGB = “Fast gripping board”; IAT = Implicit Association Test; ST-IAT = Single Target Implicit Association Test; Explicit-Slow = Classic explicit attitude question; Semantic-Diff = Semantic differential; Error-Choice = Error-Choice Method; ALT = Attribute Liking Task; Ass-Network = Associate Network.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3XX. Factor loadings after varimax rotation.

Measure	Factor 1	Factor 2	Factor 3	Factor 4
Direct-Fast				
Explicit-Fast	.82			
FGB	.76			
Indirect-Fast				
IAT		.70		
ST-IAT		.82		
Direct-Slow				
Explicit-Slow	.87			
Semantic-Diff				.96
Indirect-Slow				
Error-Choice	.49		.59	
ALT			.84	
Ass-Network	.70			
Variance explained (%)	29.46	14.77	13.65	11.40

Note. All factor loadings below .40 have been deleted. Explicit-Fast = Speeded explicit attitude question; FGB = “Fast gripping board”; IAT = Implicit Association Test; ST-IAT = Single Target Implicit Association Test; Explicit-Slow = Classic explicit attitude question; Semantic-Diff = Semantic differential; Error-Choice = Error-Choice Method; ALT = Attribute Liking Task; Ass-Network = Associate Network.

Table XXX. Correlations of the different attitude measures with self-reported behavior.

Measure	Reading-Behavior
Direct-Fast	
1. Explicit-Fast	.39**
2. FGB	.39**
Indirect-Fast	
3. IAT	.16
4. ST-IAT	-.08
Direct-Slow	
5. Explicit-Slow	.47**
6. Semantic-Diff	.06
Indirect-Slow	
7. Error-Choice	.33*
8. ALT	.30*
9. Ass-Network	.40**

Note. Explicit-Fast = Speeded explicit attitude question; FGB = “Fast gripping board”; IAT = Implicit Association Test; ST-IAT = Single Target Implicit Association Test; Explicit-Slow = Classic explicit attitude question; Semantic-Diff = Semantic differential; Error-Choice = Error-Choice Method; ALT = Attribute Liking Task; Ass-Network = Associate Network.

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