Predicting Spontaneous Big Five Behavior with Implicit Association Tests

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Abstract. According to theories brought forward recently, implicit measures based on reaction times, for instance Implicit Association Tests (IATs), should predict spontaneous behavior better than explicit measures. We applied five IATs to the measurement of the Big Five personality factors and tested whether the IATs predicted spontaneous behavior. The results show that, although implicit and explicit measures of personality dimensions were related at times, the correlations between them and with behavior suggest that these constructs should be differentiated. IATs predicted spontaneous behavior, but explicit measures did not. In contrast, explicit measures, but not IATs, were related to transparent self-ratings of behavior.

Keywords: implicit cognition, Big Five assessment, behavior prediction, Implicit Association Test

The way people present themselves need not be identical to the way they are. Moreover, the way people think they are need not be identical to the way they are. In order to avoid the methodological problems of distorted self-reports, implicit tests are often used (e.g., Fazio, 2001; Jacoby, 1991). Many of them are based on reaction times. Applied to the field of personality, such tests should measure to what extent people automatically associate certain traits with themselves, and explicit questionnaires should assess aspects of the self-concept that are more deliberately shown and personally controlled. If this were so, implicit tests should predict spontaneous behavior better than explicit scales. Testing this was the aim of the present study.

The self-concept of personality has been defined as "an associative network containing all associations of the concept of self with attribute concepts describing one's personality" (Asendorpf, Banse, & Mücke, 2002, p. 381). If explicit questionnaires are used, other factors in addition to the self-concept of personality can influence the responses, for instance, self-presentation (Furnham, 1986; Nederhof, 1985). Implicit tests, such as Implicit Association Tests (IATs) were designed to avoid such distortion. Indeed, IATs (Greenwald, McGhee, & Schwartz, 1998) seem to be less prone to faking or self-presentation effects than explicit tests are (Steffens, 2004).

The rationale for IATs is that people are able to react faster if paired concepts are associated than if associated concepts require different reactions. The difference in reaction times between these two tasks, the IAT effect, is taken to be an indicator of the degree of association between concepts. In the present case, consider a person's reaction time shown in a task constructed as follows: (a) Instances of "self" (e.g., mine) and "conscientious" (e.g., well-organized) require the same reaction, and (b) instances of "others" (e.g., your) and "not conscientious" (e.g., chaotic) require a different reaction (henceforth, the self + conscientious task). The average reaction time in this task (also called the congruent task) is compared to that shown in the complementary task in which instances of "self" and "not conscientious" are paired and instances of "others" and "conscientious" are paired (henceforth, the self + not conscientious task). People who react faster in the self + conscientious than in the self + not conscientious task are assumed to possess a higher association between the concepts "self" and "conscientious" than people showing a smaller or a reversed reaction time difference between tasks (Banaji, 2001). In other words, faster reactions seem to show the automatic or spontaneous endorsement of conscientiousness. This view is based on the assumption that individual semantic networks exist in which the connectedness of concepts mirrors their subjective association.

Why would the connectedness of concepts lead to an IAT effect? In other words, what processes underlie reaction times in IATs? According to our assumptions, people simplify the cognitive representation of the IAT task as much as possible (cf. Steffens, Jelenec et al., 2004; Steffens, Lichau et al., 2004). If two concepts are subjectively associated, they can be reduced to one concept in the internal cognitive task representation. For instance, if conscientiousness is self-related, the self + conscientious IAT task can be cognitively represented as: The self-related concepts require one reaction, the other-related concepts require the other reaction. Such a simplified task representation should speed reactions as compared to the other IAT task where

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no simplification is possible (i.e., self + not conscientious requires the same reaction). A logical deduction along this line of thought is the importance of avoiding overlapping concepts that are perfect confounds of those used as IAT concepts. For instance, if all the instances of "conscientious" were positive and all those of "not conscientious" were negative, then a participant may react quickly during the congruent IAT task by attending only to the stimulus valence (i.e., the positive concepts require the same reaction) and ignoring the stimuli's association with conscientiousness, thus turning the conscientiousness IAT into a general self-esteem IAT. In short, we reason that the basis of the IAT effect is a simplified cognitive representation in the congruent task.

Such a simplified task representation is not necessarily formed deliberately and need not be available to introspection. Therefore, people's explicit self-view does not necessarily correspond to the implicit association measured. If this were so, could behavior still correspond to the implicit associations measured? We think it could. Correlations between IAT effects and behavior could be found if the behavior, too, was automatic and beyond self-presentation. Similar to the time-pressured reactions in IATs, automatic behavior may be triggered in a given situation, and then it would not necessarily correspond to self-views. For instance, a person may be able to do chores in a very conscientious way whenever she knows that it counts. Her self-view may, thus, be that she is conscientious, and she would respond accordingly on a transparent questionnaire given no time constraints. Still, in other situations this person may tend to spontaneously fulfill unimportant chores in a haphazard way, thus, being not conscientious as far as spontaneous behavior is concerned, and this may correspond to the IAT effect shown.

It can be concluded from this line of reasoning that the correspondence between automatic self-associations and spontaneous behavior on the one hand and between controlled self-views and deliberate, controlled behavior on the other should be closer than vice versa (also see Asendorpf et al., 2002; Egloff & Schmukle, 2002). In other words, there should be at least a kernel of truth in automatic self-associations. Therefore, IATs should predict spontaneous behavior rather than explicit scales – to the extent that IATs are valid and reliable for measuring automatic associations. Indeed, there is a growing body of evidence on the validity of IATs for measuring automatic cognition (for recent reviews, cf. De Houwer, 2002; Fazio & Olson, 2003; Gawronski & Conrey, 2004). As to the reliability of IATs, internal consistency is often excellent, whereas test-retest correlations around $r_{tt} = .60$ are among the highest observed (cf. Steffens & Buchner, 2003, for a review).

Asendorpf et al. (2002) were the first to adapt the IAT to the measurement of a personality facet, in their case, shyness. They were indeed able to show that the shyness IAT predicted spontaneous shy behavior better than explicit tests did. Moreover, explicit tests predicted controlled shy behavior better than implicit ones. For example, implicit shyness correlated negatively with the number of eye contacts when meeting a stranger. Along the same line, an anxiety IAT was developed and validated (Egloff & Schmukle, 2002).

Continuing along this line of work, we tested whether spontaneous behavior could be predicted by IATs that were designed to measure the Big Five personality traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness (e.g., McCrae & Costa, 1999). In addition to those IATs, indicators of spontaneous behavior were also needed. Although scores on the dimensions of the five-factor model (FFM) have proven important in behavior prediction (Burger & Caldwell, 2000; Mount, Barrick, & Strauss, 1994), when planning our investigation, we found no study in which spontaneous Big Five behavior was observed in a laboratory setting (but see Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004, for recent related work).

Therefore, we developed indicators of spontaneous behaviors on all FFM dimensions ourselves. Indicators were selected that were supposed to show spontaneous aspects of behavior that cannot be easily controlled voluntarily. At least one behavior indicator was constructed for each of the five dimensions: a chore, an observer rating, or a self-rating under time pressure. Additionally, we chose the much used NEO-Five Factor Inventory (NEO-FFI; Borkenau & Ostendorf, 1993) to function as an explicit test. Then we tested whether the IATs predicted spontaneous behaviors, as opposed to the respective dimensions of the NEO-FFI. Specifically, we expected higher correlations between the behavior indicators and the respective IATs than between these indicators and the NEO-FFI dimensions. Additional indicators of controlled behavior were not included in our study.

Method

Participants

A total of 89 psychology students at the Universität Trier received course credit for their participation in our study. Their mean age was 22 (SD = 4), and 69 of them were female. Medium correlations of r = .30 (Cohen, 1977) could be detected with a probability of $1 - \beta = .90$.

Materials and Procedure

Tests

Five different IATs tested the extent to which participants associated *self* vs. *others* with (a) emotionally stable vs. emotionally labile (indicating neuroticism), (b) extraverted vs. introverted, (c) culturally interested vs. not culturally interested (indicating openness), (d) agreeable vs. not

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agreeable, and (e) conscientious vs. not conscientious. Five items were selected as to-be-sorted stimuli for each of the concepts. Items for the personality dimensions were selected from the German NEO-FFI that consists of 60 items, or they were generated by the experimenters. We made sure that there was no perfect confound between the to-be-measured dimension and stimulus valence. We accomplished this by selecting more extreme instances for some of the presumably more positive concepts and less extreme ones for the more negative ones (e.g., "pedantic" for conscientious, "sensitive" for emotionally labile). A computerized version of the NEO-FFI was administered with items presented in their original order. The German version of the NEO-FFI has been deemed applicable for research purposes (Schwenkmezger, 1995). Almost all of the stimuli for the conscientiousness and extraversion IATs were taken from a previous study (Steffens, 2004). All stimuli are listed in the Appendix along with translations.

Upon entering the laboratory, participants were seated in a cubicle in front of a computer and requested to respond to the five IATs. Experimental cubicles were constructed so that observers were able to watch the participants. The IAT procedure largely followed that of Steffens and Plewe (2001), and the Mac-IAT computer program (Steffens, 1999) was used. In order to avoid confounding procedural factors and person or group effects, each participant received all IATs in the same order: In correlational studies, counterbalancing and randomization introduce error variance per participant (in so far as the test conditions differ between participants) and, thus, reduce the power to detect correlations (also see Banse, Seise, & Zerbes, 2001). The distorted mean results that our procedure might provoke are negligible because our study capitalizes on correlations, not means. Stimuli related to the target dimension and the attribute dimension were presented in the center of the computer screen in an alternating fashion. Each critical IAT task consisted of a total of 104 trials (split across two blocks consisting of 62 and 42 trials, respectively). Participants were informed that their task was to categorize words as belonging to the concepts displayed at the top left or right screen corner by pressing, as quickly as possible, a response key on the left or right side of the keyboard, respectively. IAT tasks were sorted as follows: self + not conscientious (i.e., self and not conscientious displayed on the left vs. others and conscientious, on the right), self + conscientious, self + not culturally interested, self + culturally interested, self + emotionally labile, self + emotionally stable, self + introverted, self + extraverted, self + not agreeable, and self + agreeable. Then the participants completed the NEO-FFI (with a five-point scale).

Behavior Indicators

Two trained observers rated participants' reactions shown in two predefined situations as a behavior indicator of agreeableness (referred to as "observer-rated reaction upon unjust accusation" in Table 1). In the first situation, an experimenter who was waiting by the door of the laboratory asked the name of the student upon his or her arrival and then replied that they were not on the time schedule and that somebody else was expected. The student could, therefore, only take part in the experiment if the other person did not arrive. Reactions were rated on five-point verbal and nonverbal agreeableness scales. Observers were trained to differentiate between assertive behavior, anger, and disagreeable behavior. Then (as the other person did not arrive), participants were asked to enter the experimental room. The second predefined situation to obtain another rating of agreeableness was provoked after the first IAT. A computer message indicated: "Error 47: Unexpected end of file. All changes since [the starting time] have probably been lost." When called over, the experimenter asked the participants what keys they had pushed inadvertently, and warned them that they would have to start over or they would not receive credit if the data could not be saved. The observers again rated the students' reaction as to verbal and nonverbal agreeableness. The experimenter then "managed to save the data."

As an indicator of neuroticism, after the NEO-FFI, a short, horrendously demanding working memory task was presented. Participants had to attempt to keep six two-digit numbers in mind while other two-digit numbers, words, or nonwords rhyming with numbers were presented via headphones (Buchner, Irmen, & Erdfelder, 1996). After participants failed to recall at least one of the six numbers, which happened in all cases, they read on a feedback screen that their performance was "too bad" and that they should concentrate better. This message was formulated in an increasing degree of scolding. Participant ratings on an indirect measure of subjective stress after that task ("I feel somewhat strained at the moment," on a seven-point scale, presented among filler questions) served as a first indicator of neuroticism ("Indirect rating of subjective stress"). Observer ratings of reactions (an overall rating combined with ratings of five subdimensions, e.g., nervous gestures) served as a second indicator of neuroticism ("Observer-rated stress"). Next, participants were thoroughly debriefed and told that the task they had been required to manage had in fact been impossible to master.

Indicators of openness and extraversion included self-ratings given under time pressure. As an indicator of openness, questions were asked assessing how often participants attend theater and museum exhibitions ("Frequency of attending cultural events"). To measure extraversion, a computer message informed the participants that we were trying to determine how desirable two different prizes would be, and they should indicate spontaneously how appealing the prizes were to them on a five-point scale: either a group tour or a survival camp holiday ("Subjective attractiveness of two group activities"). Even though the response was to be given under time pressure, response speed was not enforced nor measured. As a second indicator of extraversion, we used the length of time that the participant

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spent deliberately in a social situation. Before leaving the laboratory, participants were asked three standardized questions as to how they felt about the study. The time they took for answering these questions was measured ("Time spent deliberately in a social situation").

As a behavior indicator of spontaneous conscientiousness, we handed participants a concentration test after the computer part of the study and asked them to fill it in with no time constraint. The d2 test (Brickenkamp, 1981) requires participants to cross out each d accompanied by two primes among similar-looking letters with various numbers of primes ("*N* correct in self-paced d2 concentration test"). We reasoned that people with high levels of spontaneous conscientiousness should fill it in more slowly and conscientiously, thus, making less mistakes (cf. also Steffens, 2004). These data are missing for two participants because of experimenter error. In the end, participants were thoroughly debriefed as to the purpose of the study.

Results

All significance tests were conducted with $\alpha < .05$. Therefore, individual *p*-values are omitted for statistically significant effects. IAT effects were computed similar to "IAT D effects" (Greenwald, Nosek, & Banaji, 2003). In particular, the difference between the mean reaction time in incongruent vs. congruent IAT blocks (in ms) was divided by the overall standard deviation for each participant. No error penalty was used.

Reliability of Measures

Internal consistencies of the IAT effects were calculated by treating the average IAT effect (difference in ms) for each stimulus as one scale item (Steffens & Buchner, 2003). The internal consistencies for the resulting 20-item scales are shown for each dimension in italics in Table 1. Furthermore, the internal consistencies of the NEO-FFI dimensions are also shown, as well as consistencies of behavior indicators containing more than one item, most of which were satisfactory. Exceptions include the Extraversion IAT and the behavior indicator of extraversion. Despite the fact that the correlation between the two indicators of extraversion was not high, we formed an index combining them because that index correlated higher with both explicit and implicit extraversion than each of the items did alone. All scales based on the ratings of two observers were internally consistent (all $\alpha >$ .80). For the sake of completeness, the means of our measures are shown in Table A1 in the Appendix.

Table 1. Internal consistencies (in *italics*) and correlations between self-ratings (NEO-FFI), the reaction Time measure (IAT), and behavior indicators (B1 and B2) within each Big Five dimension

	NEO-FFI	IAT	B1	B2
Neuroticism				
NEO-FFI	*.86*	**.28**	.11	.04
IAT		*.76*	**.22**	**.19**
Indirect rating of subjective stress (B1)			–	–.05
Observer-rated stress (B2)				
Extraversion				
NEO-FFI	*.79*	–.03	**.22**	–.08
IAT		*.51*	.10	**.22**
Subjective attractiveness of two group activities (B1)			*.55*	–.09
Time spent deliberately in a social situation (B2)				–
Openness				
NEO-FFI	*.70*	.02	**.29**	
IAT		*.68*	–.01	
Frequency of attending cultural events (B1)			*.69*	
Agreeableness				
NEO-FFI	*.77*	–.12	.12	
IAT		*.70*	**.25**	
Observer-rated reaction upon unjust accusation (B1)			*.81*	
Conscientiousness				
NEO-FFI	*.85*	**.22**	.01	
IAT		*.81*	**.36**	
N correct in self-paced d2 concentration test (B1)			–	

Notes. Statistically significant correlations ($p < .05$, one-tailed) are printed in **bold**. Internal consistencies are missing for 1-item measures.

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Within-Dimension Relations

All within-dimension zero-order correlations are shown in Table 1. The pattern of correlations remained when correlations between behavior indicators and IATs were computed controlling for the respective NEO-FFI dimension. The same is true for correlations with the NEO-FFI, controlling for the respective IAT effect.

- *Neuroticism*: As expected, the indirect self-rating of feeling strained and the observer-rated reaction to a stressful situation both correlated with the implicit, but not with the explicit measure of neuroticism. Explicit and implicit neuroticism were significantly correlated.
- *Extraversion*: The self-reported preference for a group-travel experience correlated with the explicit though not the implicit measure of extraversion, whereas the time taken to talk with the experimenter correlated with the implicit, but not the explicit measure of extraversion. The behavior indicators of extraversion did not correlate, nor did the explicit and implicit measure of extraversion correlate with each other.
- *Openness*: Self-reported cultural interest correlated with the explicit, but not with the implicit measure of openness. The explicit and implicit measure of openness did not correlate.
- *Agreeableness*: As expected, the observer rating of agreeableness was related to the implicit, but not the explicit measure of agreeableness. The implicit and explicit measures of agreeableness did not correlate.
- *Conscientiousness*: Two participants were excluded from all correlations involving d2 errors (their number of errors was > 3 *SD* above *M*). As expected, the higher implicit conscientiousness was, the higher was the number of correct reactions in the d2 test. This replicated a finding by Steffens (2004). There was no relation between the number of d2 errors and the explicit measure of conscientiousness, but the explicit and implicit measures of conscientiousness were related.

Correlations across Dimensions

In addition to these correlations that were of principal interest, there were also some statistically significant correlations across dimensions (not shown in Table 1). Some of these were found within each class of instruments. Among the NEO-FFI dimensions, neuroticism correlated negatively with all other dimensions (zero-order correlations were $r = -.42$ with extraversion, –.26 with openness, –.18 with agreeableness, and –.22 with conscientiousness). In addition, there was a positive correlation between extraversion and agreeableness ($r = .37$). Among the IATs, there was a consistent pattern of statistically significant positive correlations. Specifically, these were between openness and agreeableness ($r = .19$), openness and conscientiousness ($r = .18$), and conscientiousness and agreeableness ($r = .38$). Neuroticism correlated negatively with all of these (with openness, $r = -.24$, with agreeableness, $r = -.22$, and with conscientiousness, $r = -.20$; please note that correlations of other IATs with neuroticism were not observed with traditional IAT scoring). There were no statistically significant correlations to be found among the behavior indicators. Out of the 76 remaining possible unexpected correlations, we found two between an IAT and a NEO-FFI scale, four between a test and a behavior indicator, and one among the indicators. We conclude that this modest number of statistically significant correlations across dimensions does not seem to undermine discriminant validity.[1]

Discussion

The present study aimed to establish the validity of IATs for measuring spontaneous Big Five behavior. Our indicators of spontaneous behavior correlated with the neuroticism, extraversion, agreeableness, and conscientiousness IATs. Thus, four of the IATs we developed appear to measure what they are supposed to, leading to statistically significant, albeit not large, correlations with behavior indicators of the same constructs.

Please note that our *ad hoc* behavior indicators are not *a priori* any more valid than the IATs we put to the test. However, the fact that the IATs predicted those behaviors is in itself evidence for the validity of the tests as well as the indicators. Those behavior indicators that did not correlate with the respective IATs (extraversion and openness) were based on self-ratings. We had hypothesized that such self-ratings would be influenced by automatic processes to a considerable degree because they were to be given under time pressure. As other findings show, correlations of IATs with ratings under time pressure can be substantial (e.g., Steffens, Kirschbaum, & Glados, 2005). However, in the present case, we found no correlations between self-ratings and these two IATs, although both the extraversion and the openness self-rating correlated significantly with the respective NEO-FFI dimension. Thus, the data indicate that the current self-ratings were primarily controlled by explicit processes. In hindsight, participants probably simply ignored the instruction to react as quickly as possible. This is plausible because we did not enforce a time limit (given differences in reading speed between participants). Quite opposite to the nonexisting relationship between these self-ratings and the respective IATs, an indirect self-rating – the purpose of which could not readily be inferred by participants – was predicted by another IAT (neuroticism). Furthermore, IATs predicted observer ratings and spontaneous behaviors. Thus, our data nicely converge with those found

1 A complete table of correlations is available from the first author upon request.

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by other researchers (Asendorpf et al., 2002; Egloff & Schmukle, 2002): In line with the theoretical ideas outlined in the introduction of this article, automatic aspects of behavior are predicted better by IATs than by explicit tests, whereas controlled behavior involving self-presentation can be better predicted by explicit tests.

Additionally, each of the IATs (except for the extraversion IAT) and each of the NEO-FFI dimensions showed satisfactory internal consistency. We do not know why the results of the extraversion IAT were not so satisfactory. It could be that reaction times in that particular IAT – and, to a smaller extent, those in the other IATs we administered later in the study – suffered from their position in the IAT order. Whereas other studies have administered four IATs or more (Devos & Banaji, 2005; Steffens, Lichau et al., 2004), such tiring conditions are far from ideal. In addition, carry-over effects have sometimes been found in IATs completed in close succession (e.g., Schnabel, Banse, & Asendorpf, in press; Steffens, 2005). The extraversion IAT showed good internal consistency when administered on its own (Steffens, 2004).

Correlations between explicit and implicit measures of the same constructs were of a medium order of magnitude or smaller (Cohen, 1977). It is important to note that we found higher correlations between some of the Big Five IATs and the respective NEO-FFI dimensions in another study (Steffens, 2004) where the IATs included more trials. Longer IATs lead to more consistent and more valid IAT effects, as has been demonstrated before (Steffens & Buchner, 2003). Hence, one factor to increase the correlation could be to lengthen the IAT. Another idea to increase correlations could be to present the items that measure the five dimensions of the FFM in a blocked fashion in the NEO-FFI, and tell the participants which traits are measured. In the present study, extraversion, for example, was inferred (indirectly) from responses given to statements that are typical for extraversion; self-ascription of extraversion was not measured directly. This is the case in spite of the convention to call explicit questionnaires "direct" tests and reaction time measures, "indirect." Evidently, scores obtained on the NEO-FFI and self-ascriptions of traits overlap to some extent (Scandell & Wlazelek, 1999), but still, those test scores need to be differentiated from self-ascriptions. With respect to transparency, the IAT measures the automatic self-ascription of a given trait more directly. Thus, the relationship between the implicit and the explicit test might be stronger if participants are directly asked about their self-ascriptions in the explicit test, too. In other words, a second way to increase the correlation between explicit measures and IATs could be to directly ask how extraverted etc. participants think they are during the explicit test.

There are at least two reasons why the IATs did not explain a larger portion of the variance in spontaneous behavior. First, the IAT effects are also affected by factors other than the association of superordinate concepts, for example, individually different associations of the specific stimuli used (Steffens & Plewe, 2001). Second, IAT effects in IATs that comprise many different words as stimuli are apparently confounded by cognitive skills (cf. McFarland & Crouch, 2002; Mierke & Klauer, 2001). We were recently able to show that correlations between IATs and related measures increase if these two problems are avoided, meaning few stimuli were used in the IATs, and these stimuli were related to the superordinate concepts more closely than stimuli used typically (Steffens, Kirschbaum, & Glados, 2005). Using those IATs with concepts as stimuli may increase the relation between the IAT effect and spontaneous behavior.

Still, there is a third possible reason why IATs' power to predict spontaneous behavior may be rather limited. The question of how automatic self-associations are formed is yet to be answered. Furthermore, it is unknown to what extent automatic self-associations influence spontaneous behavior, or to what extent such associations are formed as a consequence of previous behavior. Indicators of both should correlate only to the degree that automatic self-associations are related to spontaneous behavior. For instance, if automatic self-associations depended on feedback received regularly in childhood and if that feedback differed from spontaneous behavior, no relation would be expected. Pinning down how automatic self-associations are formed and subsequently changed is a task for future research. In any case, we may conclude that the present findings are compatible with our main hypothesis: Spontaneous Big Five behavior is predicted by IATs rather than explicit tests.

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Appendix

Stimuli used in the IATs.

Selbst – self: ich, mein, mir, mich, meins – I, mine, me, me, mine

Andere – others: du, dein, dir, dich, deins – you, your, you, you, yours

Emotional stabil – emotionally stable: sicher, ausgeglichen, zuversichtlich, ruhig, unbeeindruckt – secure, balanced, confident, calm, unimpressed

Emotional labil – emotionally labile: sensibel, unsicher, gefühlsbetont, empfindsam, beunruhigt – sensitive, insecure, emotional, touchy, worried

Extravertiert – extraverted: selbstsicher, aktiv, gesprächig, energisch, optimistisch – self-assured, active, talkative, energetic, optimistic

Introvertiert – introverted: zurückhaltend, unabhängig, ausgeglichen, zuhörend, ruhig – withdrawn, independent, balanced, attentive, quiet

Kulturinteressiert – culturally interested: belesen, wißbegierig, offen, originell, elitär – well-read, curious, open, inventive, elitist

Nicht kulturinteressiert – not culturally interested: uninformiert, gelangweilt, konventionell, sportlich, verschlossen – uninformed, bored, conventional, athletic, not open

Verträglich – agreeable: verständnisvoll, nachgiebig, kooperativ, wohlwollend, höflich – understanding, compliant, cooperative, benevolent, polite

Nicht verträglich – not agreeable: kritisch, antagonistisch, stur, hartnäckig, reizbar – critical, antagonistic, stubborn, persistent, irritable

Gewissenhaft – conscientious: pedantisch, willensstark, diszipliniert, organisiert, zuverlässig – pedantic, strong-willed, disciplined, organized, dependable

Nicht gewissenhaft – not conscientious: ziellos, cool, chaotisch, unordentlich, unpünktlich – aimless, laid-back, chaotic, untidy, late

Table A1. Mean IAT effects and NEO-FFI scores (standard deviations)

Dimension	IAT ms difference	IAT effect	NEO-FFI
Neuroticism	–80 (134)	–.17 (.25)	1.72 (.68)
Extraversion	62 (106)	.12 (.18)	2.45 (.56)
Openness	189 (143)	.39 (.23)	2.88 (.47)
Agreeableness	109 (115)	.27 (.22)	2.63 (.53)
Conscientiousness	252 (179)	.53 (.28)	2.56 (.58)

Note. IAT effects were computed similar to the IAT ms difference except that they were divided by each participant's overall standard deviation.

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