Employing Automatic Approach and Avoidance Tendencies for the Assessment of Implicit Personality Self-Concept

The Implicit Association Procedure (IAP)

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Abstract. A new chronometric procedure, the Implicit Association Procedure (IAP), was adapted to assess the implicit personality self-concept of shyness. A sample of 300 participants completed a shyness-inducing role play and, before or after the role play, a shyness IAP, a shyness Implicit Association Test (IAT), and direct self-ratings. The experimental group was instructed to fake nonshyness. The control group did not receive this instruction. IAT and IAP were unaffected by position effects, and were less susceptible to faking than direct self-ratings with regard to mean levels and correlates. Under faking, correlations between direct and indirect measures decreased, and direct but not indirect measures showed higher correlations with social desirability and lower correlations with observed shyness. Despite many similarities, the true correlation between IAT and IAP was estimated only .61, indicating high method-specific variance in both procedures. The findings suggest that indirect measures are more robust against faking than traditional self-ratings but do not yet meet psychometric criteria for practical assessment purposes.

Keywords: implicit self-concept, Implicit Association Test, Implicit Association Procedure, shyness, fakability

Individual behavior is the result of reflective and impulsive processes (e.g., Strack & Deutsch, 2004). Both aspects should be taken into account for the assessment of interindividual differences. Traditional questionnaires rely on the willingness and ability of respondents to inform in a reflective way, and are, therefore, biased by social desirability concerns and introspective limits (Greenwald & Banaji, 1995). New chronometric procedures, most prominently the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998), were shown to be relatively robust against social desirability biases, and to tap cognitive representations that are not assessed by questionnaires (for a review, see Nosek, Greenwald, & Banaji, in press). Asendorpf, Banse, and Mücke (2002) employed the IAT for the assessment of the personality self-concept that was defined as associative network containing all associations of the concept of self with personality attributes. Using shyness as an example, Asendorpf et al. (2002) showed that a) the IAT reliably assessed individual differences in the implicit personality self-concept that b) were partly independent from traditional self-ratings, c) increased significantly the prediction of spontaneous behavior, and d) were less susceptible to faking instructions. The present study extended this approach into three different directions.

Research Question 1: The IAT and IAP as Parallel Assessment Procedures

We attempted to replicate the findings for the shyness IAT with a new, parallel procedure. Priming procedures were only partially successful as adequate referents to the IAT (Nosek et al., in press). For this

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purpose, we modified the Evaluative Movement Assessment (EMA) from Brendl, Markman, and Messner (2005). The modification was named *Implicit Association Procedure (IAP)*. Similar to the IAT, the IAP aims to assess automatic associations between concepts (e.g., "me," "shy," "nonshy") through a series of discrimination tasks. Differently from the IAT, the IAP triggers automatic approach (pulling the joystick toward a target) and avoidance behavior (pushing the joystick away from a target) by two joystick movements (cf. Chen & Bargh, 1999; Neumann, Hülsenbeck, & Seibt 2004). The detailed procedure of the IAP is described in the method section. In line with the EMA methodology it was hypothesized that attributes that play an important role in the self-concept could be responded to more quickly with a joystick movement towards oneself than away from oneself.

Research Question 2: Dissociations of Indirect and Direct Measures Under Faking

Previous research revealed that the IAT is slightly susceptible to faking instructions (Nosek et al., in press). However, faking effects are a threat to the validity only if *differential faking* (different individuals fake to a different degree) occurs. The present study investigated both faking main effects (as in the 2002 study of Asendorpf et al., Study 2) and effects on the correlations of direct and indirect shyness measures by contrasting an experimental group that was instructed to appear nonshy, and a control group that was instructed to act naturally. Stronger effects of differential faking on direct than indirect measures were expected to be apparent in three ways. First, the correlation between direct and indirect shyness should be moderate in the control group (cf. Asendorpf et al., 2002, Study 1) and much lower in the experimental group. Second, differential faking should increase the negative correlation between social desirability and direct shyness because the more participants fake good, the higher will be their social desirability score, and the lower their shyness score. In contrast, correlations between indirect shyness and social desirability should be low in both experimental groups. Third, differential faking should decrease the correlation between direct shyness self-ratings and observer judgments of shyness, because behavior can be faked less easily than answers in a questionnaire. In contrast, correlations between indirect shyness and observer judgments should be unaffected by faking instructions.

Research Question 3: State Influences on the Indirect Measures

It has been found in several studies (Schmukle & Egloff, 2004) that the internal consistencies of IATs were satisfactory (between .70 and .80) whereas their retest or parallel test reliabilities were somewhat lower (between .50 to .60). This suggests that IATs capture both stable interindividual differences and occasion-specific variance. Sources for occasion-specific variance are a) changes in test taking strategies and b) state changes. Recently, Schmukle and Egloff (2004) showed that the mean scores of an anxiety IAT did – in contrast to direct anxiety measures – not increase when anxiety was experimentally induced. In order to replicate this immunity to state changes we studied the robustness of the shyness IAT and IAP with regard to their mean level and their correlates by comparing participants who completed them before or after a shyness-inducing role play.

Methods

Participants

Participants were 300 nonpsychology university students who were recruited on the campus of Humboldt University Berlin (150 female, 150 male; age M = 24.5 years, range 20–34 years; native speakers of German). Following Study 2 of Asendorpf et al. (2002), participants were asked to participate in "a job application procedure" (faking condition, n = 240, 120 of either sex) or "a study on social perception" (control condition, n = 60, 30 of either sex). In the first case, they were motivated for participation by informing them that the study included a simulated job assessment center and video feedback on their performance, and they were offered DM 20 (approximately US $ 10) for the 1.5 hour study. In the second case, they were motivated by offering them feedback on their results after the study, and they received DM 15 (approximately US $ 7.5) for the 1 hour study.

Assessments and Measures

Overall Procedure and Design

All participants a) completed an indirect shyness test (either IAT or IAP), b) judged themselves on bipolar personality-describing items, c) were video-taped in a shyness-inducing role play, d) completed a different indirect shyness procedure (IAP or IAT), e) judged

themselves on other personality scales, f) completed a retest of d), and g) were interviewed about the indirect tests. Participants in the experimental group additionally received video feedback on their performance in the role play. The shyness items were identical for both indirect procedures and were included as direct self-ratings in steps b) and e). The direct shyness ratings, the IAT, the instructions for the two experimental conditions, and the role play were identical to Study 2 of Asendorpf et al. (2002).

There were two between-subject variations: *faking instruction* and *position* of the two indirect tests. Consistent with their invitation, participants received either the faking instruction (assessment center group) or the honesty instruction (social perception group). Invitations were scheduled such that approximately every fifth participant was in the social perception group. Within each group, half of the participants completed first the IAT and later IAP and IAP retest; the other half completed first the IAP and later IAT and IAT retest. Assignment to the 2 orders alternated between successive participants.

Finally, participants were thanked, asked for permission of analyzing the videotapes (all agreed), and were promised feedback on their results (control participants only). Four months later, participants received a letter explaining the procedures and general findings, and control participants were invited for a feedback session on their individual results.

Instructions

Upon arrival at the lab, participants in the faking condition were instructed to present themselves in the following simulated assessment center as favorably as possible in order to get a job that required to be able to warm-up strangers quickly and to avoid insecure behavior. Participants in the control condition were informed that they would participate in a study on social perception, and that they should answer all questions as honestly as possible (see Asendorpf et al., 2002, for details).

Role play

The role play was identical for all participants. Participants had to small talk with their "future boss" for about 10 minutes. The future boss was an older-looking, unfamiliar, opposite-sex, advanced psychology student who wore a business suit and slightly patronized the participant (see Asendorpf et al., 2002, for details). The interaction was videotaped with a camera that was operated from another room. When participants interrupted the role play the confederate tried to get them back as quick as possible. The time period until the role play was continued was defined as missing. For the judgments of shy behavior secondary tapes were prepared that contained the first three minutes of noninterrupted role play of each participant.

Direct self-ratings

Direct self-ratings were assessed on the computer and were presented in a fixed random order. Bipolar *shyness* pairs in step b were identical to Asendorpf et al. (2002) and were mixed with 30 conscientiousness, intellect, and irritability pairs. In order to minimize transfer effects from the preceding indirect test, the shyness items occurred only among the last 20 items. Self-ratings in step e started with a 32-item self-monitoring scale that should again minimize transfer effects and was included for the purpose of another study. The scale was followed by the 10 *shyness* and irritability items of step b and concluded with the *social desirability scales* from Lück and Timaeus (1969) and Stöber (1999; without the Item "Have you ever consumed drugs") that were aggregated. The reliability of the direct self-ratings was separately calculated for both experimental conditions and was above $\alpha = .84$ in each case.

Implicit Association Test (IAT)

The shyness IAT was identical to the 2002 studies of Asendorpf et al. (2002) studies.[1] Task sequence and stimuli are depicted in Table 1. IAT scores were computed by subtracting mean response latencies in Sequence 3 from Sequence 5 such that high IAT scores represented quicker associations of me-shy and others-nonshy relatively to me-nonshy and others-shy.

Implicit Association Procedure (IAP)

The IAP was based on the EMA (Brendl et al., 2005) and was modified noticeably due to the results of two pilot studies. The final procedure is depicted in Table 2. Participants had to push a joystick toward or away from oneself dependent on whether a stimulus had to be associated with me or notme. Differently from the

[1] To maximize comparability between both studies we do not report results for the improved D-scores (Greenwald, Nosek, & Banaji, 2003). We calculated D-sores and found only minimal changes (differences in correlations below .02) most likely because we already included a major feature of the D-scores, namely inclusion of practice trials for combined tasks.

Table 1. Implicit Association Test for Shyness: Task sequence and stimuli.

Sequence	*N* of trials	Task	Response key assignment Left key	Right key
1	40	Target discrimination	Me	Others
2	40	Attribute discrimination	Shy	Nonshy
3	80	Initial combined task	Me, shy	Others, nonshy
4	40	Reversed target discrimination	Others	Me
5	80	Reversed combined task	Others, shy	Me, nonshy

Stimuli			
Me	Others	Shy	Nonshy
I	They	Inhibited	Uninhibited
Self	Them	Insecure	Secure
My	Your	Timid	Daring
Me	You	Reticent	Candid
Own	Other	Reserved	Open

Note. Stimuli can be obtained from the authors.

EMA, the joystick was moved vertically rather than horizontally because participants of a pilot study had difficulties to associate horizontal movements with me-notme. Similar to the IAT, the IAP combined discriminations of shy versus nonshy (attribute discrimination) with discriminations of me versus notme (target discrimination). In the IAP, only me was explicitly shown on the screen and no label for alternative targets was given. Therefore, notme described the nonself-relevant alternatives better than others. Participants first learned to discriminate three me and notme words. In the following task, five shy and nonshy words were added and had to be pulled to or pushed away from the participant, respectively. Finally, the direction for the shy and nonshy words was reversed. The IAP score was computed by subtracting mean latencies in Sequence 2 from Sequence 3 (see Table 2). In the combined tasks, stimuli were randomized in order within 8 blocks of 16 trials. Stimulus order was not randomized between participants.

The joystick was located on the table in front of the keyboard, and could be operated with the right or the left hand. As in the IAT, participants were instructed to respond as quickly and accurately as possible. During the combined tasks, the correct answer directions for the shy (SHY = ME in Sequence 2) or nonshy (NONSHY = ME in Sequence 3) words were presented in red in the upper left screen corner. During all trials the word "me" with a frame around – representing the participant – was presented in the center of the lowest screen line. Stimuli and the stimulus mask appeared in white in the screen center. Trials began by displaying the mask XXXX for 500 ms followed by a target or attribute word. The stimulus disappeared when participants moved the joystick clearly in one direction, whereas the reaction time was registered immediately at the beginning of the movement. Reaction time was measured as the time passed from the beginning of the stimulus presentation. After correct responses the interstimulus interval was 600 ms. After incorrect responses the stimulus was immediately replaced by a) the word FEHLER (German for "error") if the joystick was moved in the wrong direction, b) the words ZU LANGSAM (German for "too slow") if there was no response after 3,000 ms, or c) the words ZU FRÜH BEWEGT (German for "moved too early") if there was any response during the stimulus mask. Error announcements were displayed in yellow in the screen center for 200 ms and were followed by the 600 ms interstimulus interval.

Following data reduction procedure for the IAT the first two responses in the combined tasks were not analyzed and response latencies below 300 ms were recoded as 300 ms. Error trials were excluded from analysis. Calculation of the internal consistencies (Cronbach's α across 4 subtests of 32 trials) and the test scores was based on log-transformed latencies. For presentation purposes, test scores are reported in milliseconds. In a pilot study, the final IAP procedure showed satisfactory internal consistency ($\alpha = .83$) and correlated .50 with a shyness IAT and .30 with explicit shyness (see Schnabel, 2004, for details).

Interview about the indirect procedures

All participants were interviewed by the experimenter about problems with the IAT or IAP, and whether they used particular strategies during the IAT or IAP in

Table 2. Implicit Association Procedure for Shyness: Task sequence.

Sequence	*N* of trials	Task	Joystick direction assignment	
			To the participant	Away from the participant
1	24	Target discrimination	Me	Notme
2	128	Initial combined task	Me, shy	Notme, nonshy
3	128	Reversed combined task	Me, nonshy	Notme, shy

Note. The 5 shy and 5 nonshy words and the 3 me (self, my, own) and 3 notme (your, them, other) were identical to the IAT stimuli.

Table 3. Summary statistics and instruction effect for the main variables (Study 2).

Variable (range of scores)	Faking $n = 240$[a]		Control $n = 60$[b]		Instruction effect $df = 298$[c]		
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
IAT	–115 ms	194 ms	–76 ms	169 ms	1.99	.05	.23
IAP	–85 ms	134 ms	–62 ms	142 ms	1.27	.21	.15
Bipolar shyness self-rating (1–7)	1.85	0.59	3.58	1.01	17.3	.001	2.00
– before role play	1.90	0.64	3.62	1.01	16.3	.001	1.89
– after role play	1.79	0.59	3.54	1.03	17.3	.001	2.00
Social desirability score (0–1)	0.85	0.14	0.48	0.17	17.8	.001	2.06
Observer shyness judgment (1–7)	3.72	1.19	4.11	1.26	2.29	.02	.27

Note. M and *SD* refer to raw scores, statistical tests to log-transformed scores in the case of the IAT and IAP latencies. The effect sizes *d* were defined such that positive scores indicate less shyness in the faking condition.
[a] $n = 239$ for IAT and IAP; [b] $n = 59$ for IAT and IAP. [c] $df = 294$ for IAT and IAP, $t = \sqrt{F}$ in case of ANOVAs.

order to decrease error rate, increase speed, or make a favorable impression.

Judgments of shy behavior

Four student judges who were blind to the experimental condition independently rated their overall impression of the participants' shyness. Each minute of the 3-minute secondary tapes was separately rated on a 7-point scale ranging from 1 = not shy to 7 = shy. The judgments were anchored by two examples of extremely shy and extremely nonshy participants from Study 1 of Asendorpf et al. (2002). For each participant the 12 ratings were averaged. The reliability (interjudge agreement) was above $\alpha = .92$ for both conditions.

Results

Instruction and Position Effects on Indirect, Direct, and Behavioral Measures

IATs

Error rates were $M = 5.1\%$, $SD = 3.6\%$ for the first and $M = 4.9\%$, $SD = 3.8\%$ for the second IAT. IAT data of three extreme scorers (25% error) were excluded from analyses. All other error rates were below 20%. Internal consistency α was calculated across four subtests containing the trials 3–20, 21–40, 41–60, and 61–80, and was .78 for test and .76 for retest and highly similar for all conditions; in particular, it was not lower in the faking condition. The retest reliability of the IAT was $r = .68$.

Effects of instruction, position, and their interaction on the IAT means were tested by a 2×2 ANOVA. A significant effect was found only for instruction, $F(1, 294) = 3.97$, $p < .05$. Table 3 indicates that participants had lower IAT scores in the faking condition than in the control condition. Although the effect size was small, it suggested that some participants manipulated the IAT in order to present themselves as nonshy. Therefore, participants' reports in the postexperimental interview about faking the IAT were related to their IAT scores. In the faking condition, 57 participants reported attempts to bias IAT results by vividly imagine themselves as a nonshy job applicant; one other participant reported to have deliberately committed errors. A *t* test contrasting them with the other 181 participants in the faking condition confirmed the hypothesis that they had lower IAT scores, $t(237) = 1.78$, $p < .05$, $d = .23$, one-tailed tests. When these 58 participants were excluded from analysis, the remaining

participants had only marginally lower IAT scores than those in the control condition, $t(238) = 1.44$, $p < .08$, $d = .19$. In terms of untransformed reaction times, the mean IAT score was −154 ms for fakers, −103 ms for assumed nonfakers, and −76 ms for control participants. Because some of the assumed nonfakers might have tried as hard as the fakers to influence the IAT, but did not report it, the instruction effect for the IAT seems to be due to the tendency of a minority of participants to vividly imagine themselves as nonshy job applicants.

IAPs

Error rates were similar to the IAT and were $M = 5.0\%$, $SD = 5.3\%$ for the first and $M = 3.8\%$, $SD = 3.5\%$ for the second IAP. IAP data of two extreme scorers (> 40% error) were excluded from analyses. All other error rates were below 24%. Cronbach's α was evaluated similarly to the IATs across 4 subtests containing the trials 3–32, 33–64, 65–96, and 97–128. It was .83 for test and .77 for retest and highly similar for all conditions. The retest reliability of the IAP was $r = .65$.

Effects of instruction, position, and their interaction on the IAP means were tested by a 2 × 2 ANOVA. No significant effects were found. In particular, the instruction effect was not even marginally significant, $F(1, 294) = 1.61$, $p = .21$. Thus, the IAP tended to be more robust than the IAT with regard to faking. This conclusion was also supported by an analysis of reported faking. In the faking condition, 68 participants reported attempts of influencing the IAP outcome. In 64 cases, they reported to have taken the perspective of a nonshy job applicant; 4 other participant reported to have deliberately committed errors. These figures were slightly higher than for the IAT. However, a t test contrasting them with the other 171 participants in the faking condition did not even reveal marginal differences, $t < 1$. In terms of untransformed reaction times, the IAP score was −91 ms for fakers, −83 ms for assumed nonfakers, and −62 ms for control participants. Although the rank-order of these means was identical with the results for the IAT, the differences between the means were minimal.

Direct self-ratings

Effects of instruction, position and their interaction on the shyness self-ratings were tested by a mixed 2 × 2 ANOVA with instruction as a between-subjects factor and order as a within-subjects factor. A very large instruction effect was found, $F(1, 298) = 298.9$, $p < .001$. Participants in the faking condition reported shyness that was 2 standard deviations lower than in the control condition (see Table 3). In addition, a moderate position effect was found, $F(1, 298) = 13.25$, $p < .001$, $d = .40$ (computed as $\sqrt{(M_1 - M_2)/SD}$ where SD is the standard deviation of the difference scores; see Cohen, 1988). Participants in the faking and in the control group reported somewhat less shyness after the role play than before (see Table 3). This may be attributed to the mastery of the role play that probably made participants to consider themselves as less shy than before. The interaction effect was not significant, $F < 1$.

Observer judgments

As can be seen in Table 3, participants in the faking condition were judged as less shy than those in the control condition but this instruction effect was not large compared to the effect for the direct ratings.

Correlational Analyses

Position effects

Explored were position effects on the correlations between implicit and explicit shyness measures and observer judgments both overall and within the faking and the control group. All order effects were small and not even marginally significant. Furthermore, the self-ratings before and after the role play correlated above .83 in both conditions, which is close to the reliability of these ratings. Therefore, the two shyness self-ratings were averaged for each participant, yielding one aggregated index of the explicit self-concept of shyness, and the position of the indirect measure was ignored in the following analyses.

Table 4 indicates that IAT and IAP were moderately correlated in both the faking and the control group and showed highly similar correlations with the other main variables. Thus, all major IAT correlates were replicated with the IAP. Therefore, both IAP and IAT were z-transformed within experimental condition and then averaged, yielding one aggregated index of the implicit self-concept of shyness.

Instruction effects

The correlations of the aggregated direct and indirect shyness measures (see lower right-hand side of Table 4) showed the dissociations that were expected under faking. *First*, implicit and explicit shyness was sig-

Table 4. Correlations of the main variables by instruction.

	1	2	3	4	5	6
1. IAT		.50***	.87***	.15*	−.07	.14*
2. IAP	.44***		.87***	.18**	−.09	.10
3. Implicit shyness[a]	.85***	.85***		.19**	−.09	.14*
4. Explicit shyness[b]	.35**	.49***	.50***		−.48***	.13*
5. Social desirability	−.13	−.09	−.13	−.17		−.08
6. Observer judgment	.17	.28*	.27*	.36**	.16	

Note. Correlations above the diagonal refer to faking condition ($n = 238$), correlations below the diagonal to control condition ($n = 58$). * $p < .05$ ** $p < .01$ *** $p < .001$.

[a] Mean of z transformed IAT and IAP.

[b] Mean of the bipolar shyness self-ratings before and after the role play.

nificantly less strongly correlated in the faking condition than in the control condition, $z = 2.39$, $p < .01$, one-tailed tests. *Second*, implicit shyness did neither correlate with social desirability in the faking nor in the control group. In contrast, explicit shyness correlated significantly more negatively with social desirability in the faking than in the control condition, $z = 2.41$, $p < .01$. *Third*, the correlation of the observer judgments with explicit shyness decreased significantly under faking ($z = 1.67$, $p < .05$) whereas the correlation with implicit shyness did not ($z = .92$, *ns*).

Discussion

The present study employed a new indirect assessment procedure, the Implicit Association Procedure (IAP), to assess the implicit personality self-concept of shyness and compared it to the Implicit Association Test (IAT). Both procedures were unaffected by position effects (before or after a shyness-inducing role play), and were less susceptible to faking instructions than traditional self-ratings with regard to both mean levels and their correlations. Under faking, the correlations between indirect and direct measures decreased, and direct but not indirect measures showed higher correlations with social desirability and lower correlations with observed shyness.

Although IAP and IAT were fairly robust to faking, even under faking their correlation with observed shyness was not higher than the correlation between explicit shyness and observed shyness. We also explored correlations with indicators of spontaneous and controlled shy behavior but a double dissociation pattern (indirect measures predicted spontaneous and direct measures predicted controlled behavior, Asendorpf et al., 2002) could not be replicated. Although the behavioral indicators correlated significantly with observer judgments they were uncorrelated with implicit and explicit shyness (for details, see Schnabel, 2004). It seemed that the role play framework itself changed the meaning of behaviors that were valid indicators of the shyness self-concept in the naturalistic interaction situation (Asendorpf et al., 2002, Study 1).

IAP and IAT can be considered parallel procedures because their structures and their results were highly similar. However, when the .50 between-test correlation was corrected for reliability their true correlation was estimated only .61 which is not high as compared to parallel direct measures. There are two differences between IAT and IAP. First, the IAP does not explicitly show the opposite target category (i.e., notme), and offers potential to omit it completely and to assess associations with unipolar concepts. Second, the IAP employs automatic approach and avoidance tendencies. Future research should explore whether the IAP is superior to the IAT in domains where approach-avoidance tendencies are especially relevant (e.g., object fears). A disadvantage of the IAP is that program routines are more complex than for the IAT because a joystick has to be implemented.

Another reason for the low between-test correlation is that both procedures seem to capture occasion-specific variance which is indicated by the discrepancy between internal consistency and test-retest correlation. Due to their robustness against faking, IAT and IAP are interesting research instruments. On the other hand, their weaknesses (low between-test and retest correlations; for other psychometric problems, see Schnabel, Banse, & Asendorpf, in press) showed that current indirect procedures are not ready for the assessment of stable interindividual differences at a psychometrically satisfactory level.

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