Together we are strong: Explicit and implicit paranormal beliefs predict performance in a knowledge test of paranormal phenomena better than explicit beliefs alone

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1. Introduction

The belief in paranormal phenomena (e.g., psi, witchcraft, superstition, spiritualism, extraordinary life forms, precognition) is probably as old as mankind itself. It is not only a common topic in popular media, but also in science (e.g., Bem, 2011; Irwin & Watt, 2007). Notwithstanding an ongoing controversy concerning the ontological reality of so-called paranormal phenomena (e.g., Bem, 2011; Wagenmakers, Wetzels, Borsboom, & van der Maas, 2011), many people in the general population throughout the world believe in such phenomena (e.g., Hergovich, Schott, & Arendasy, 2008; Houran, Irwin, & Lange, 2001; Rice, 2003; Swami, Piehschnig, Stieger, & Voracek, 2011). Because self-reported beliefs in general and paranormal phenomena in particular can be hampered by social inhibition, impression management and cultural expectations, past research suggested the use of a new indirect measurement approach often summarized as implicit measures (e.g., Implicit Association Test, IAT; Greenwald, McGhee, & Schwartz, 1998). These implicit measures are not only less prone to social desirability tendencies, but also assess rather implicit (i.e., automatic, unconscious) aspects (e.g., Weeks, Weeks, & Daniel, 2008; for a discussion about implicitness, see De Houwer et al., 2009).

The IAT—as the flagship of implicit measures—proved to be useful in assessing diverse psychological aspects (e.g., self-concepts, attitudes, stereotypes). In a large meta-analysis about the predictive validity of implicit (i.e., questionnaire-based) and implicit measures, for example, the latter had significant incremental validity among explicit measures (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Therefore, implicit measures are capable of assessing additional (automatically elicited) behaviors apart from the conscious ones usually assessed by questionnaire-based measures (see also Strack & Deutsch, 2004, for dual-process theories). This makes implicit measures especially interesting for assessing paranormal beliefs (PB). Some people might decline to believe in paranormal phenomena (e.g., due to social desirability forces), but implicitly believe that they do exist.

1.1. Present study

In the present study we developed a PB Implicit Association Test (PB-IAT) and analyzed whether measuring implicit (i.e., automatic) PB is beneficial over measuring explicit PB. As a criterion measure, we used a knowledge test about paranormal phenomena. We assumed that a stronger PB is reflected by a greater knowledge of paranormal phenomena. For example, a strong belief in astrology comes with a higher probability of knowing the star sign which comes after...
Libra, or a strong belief in witchcraft comes with a higher probability of knowing that the "hammer against witches" (Latin: Malleus Maleficarum) was neither a tool nor bouquet garni, but rather an infamous treatise on witches from the middle-ages. If implicit PB has incremental value in predicting knowledge about paranormal phenomena, then individuals with strong explicit and strong implicit PB should have the highest score in the knowledge test.

2. Method

2.1. Participants

Subjects (N = 74; 69% women) were on average 36.0 years old (SD = 14.23, range 17 to 66) with diverse highest educational qualifications (9.5% compulsory secondary education, 83.7% post-secondary diploma, 6.8% graduate degree). The participants' interest in the topic of paranormal phenomena was M = 4.7 (SD = 2.92, range 0 to 10; 0: No interest, 10: Great interest).

2.2. Materials

2.2.1. Paranormal Belief Implicit Association Test (PB-IAT)

The IAT (Greenwald et al., 1998) is a keyboard-based speeded sorting task. The idea behind the IAT is that strong associations lead to fast reactions and weak associations to slow reactions. Therefore, the IAT uses paired concepts to measure association strengths by reaction time differences in five consecutive blocks (Blocks 1, 2, and 4 are practice blocks; Blocks 3 and 5 are test blocks where paired concepts are presented).

We used a personalized version of the IAT as suggested by Olson and Fazio (2004) to reduce the influence of extrapersonal (cultural) associations. This personalized IAT uses idiosyncratic categories (I like vs. I don't like) as well as stimulus words with high inter-individual differences regarding their preferences (e.g., coffee, football, beer, monday). To measure implicit PB, we used the concepts paranormal (sample words: witchcraft, telepathy, divination, superstition) and natural (sample words: reality, ground, animals, plants). No error feedback was given because of the idiosyncratic nature of the stimuli in line with Olson and Fazio (2004). The PB-IAT had very good reliability (α = .90).

2.2.2. Revised Paranormal Belief Scale (RPBS)

The RPBS (Tobacyk, 2004) is one of the most widely used measures of general PB. It uses 26-items covering several aspects such as traditional religious beliefs, psi, witchcraft, superstition, spiritualism, extraneous life forms, and precognition (7-point Likert scales; 1: Strongly disagree, 7: Strongly agree). As proposed by Lange, Irwin, and Houran (2000), we used a two-factor solution (based on Rasch-scaling) which is psychometrically sound and proved construct validity (e.g., Houran, Thalbourne, & Ashe, 2000). Therefore, we calculated two scores based on the recommendations of Lange et al. (2000): New Age Philosophy (NAP: e.g., psi, reincarnation, astrology; sample α = .91), and Traditional Paranormal Beliefs (TPB: e.g., the devil, heaven and hell, witchcraft; sample α = .69).

2.2.3. Knowledge test of paranormal phenomena (K-PP)

The K-PP is a self-developed knowledge test of paranormal phenomena using 35 multiple-choice items. Each question used four distractors plus one “don't know” option (example item “Who was Nostradamus? 1: Magician, 2: King, 3: Astrologer, 4: Faith healer”). Only one distractor was correct. Each question was coded as correct (+1) or incorrect (−0). “Don't know” answers were coded as 0. After reliability analysis, two items had to be excluded because of negative item-scale correlations (final N = 80). In general, item difficulties (M = 0.32, SD = 0.12) covered the whole range from very easy items (M = 0.99; i.e., was solved by almost everyone) to very hard items (M = 0.01; i.e., was solved by hardly anyone). Therefore, the knowledge test was well balanced regarding test difficulty. A factor analysis (principal component analysis; varimax rotation) revealed a clear one-factor solution regarding the scree-plot criterion (detailed results omitted for brevity).

2.3. Procedure

Participants were recruited through personal contacts (i.e., friends, relatives). Measures were completed in the following sequence: PB-IAT, RPBS, K-PP, and demographics. Finally, participants were thanked and dismissed.

2.4. Analysis

The IAT effect was calculated using the D measure (Greenwald, Nosek, & Banaji, 2003) with higher scores indicating stronger implicit PB. One participant had to be excluded because of non-compliance (i.e., clicking through the IAT).

3. Results

3.1. Intercorrelations

As expected, participants with a high interest in paranormal phenomena also had higher scores in the K-PP as well as a stronger explicit PB (both subscales; see Table 1). Furthermore, participants with a stronger explicit (but not implicit) PB had also higher scores in the K-PP. All variables were uncorrelated with participant’s age except for the interest in paranormal phenomena, which declines with age. In line with past research, explicit and implicit aspects were uncorrelated (e.g., Bosson, Swann, & Pennebaker, 2000).

Although implicit PB was not significantly correlated with the knowledge test score, this does not imply that implicit PB is of no further use for explaining knowledge about paranormal phenomena. Past research on implicit/explicit aspects (e.g., self-esteem: Jordan, Spencer, Zanna, Hoshino-Browne, & Corel, 2003; self-assessed intelligence: Dislich et al., 2012) found that the interaction of the two concepts (i.e., looking at both aspects together rather than separately) had predictive value. Therefore, we additionally calculated a moderated regression.

3.2. Regression analysis

Prior to analyses, implicit and explicit PB (both subscales separately) were centered and their interaction was represented by a product term (Aiken & West, 1991). We calculated a stepwise moderated regression by including implicit and explicit PB in a first step and the interaction term additionally to implicit explicit PB in a second step. This was done twice, first for the NAP subscale and then for the TPB subscale (see Table 2). The K-PP was the dependent variable. The results showed that although the main effects (from Step 1) were not significant (except for Step 1 and the TPB subscale), additionally including the interaction term in Step 2 raised the explained variance substantially, but only when using the NAP subscale (see Table 2). Simple slope tests according to Aiken and West (1991) found that participants with strong explicit belief in New Age Philosophy and strong implicit PB had a significantly greater knowledge of paranormal phenomena than participants with weak explicit and strong implicit PB (B = 0.42, t = 2.78, p = .007). In general, partici-
pants with strong explicit belief in New Age Philosophy and strong implicit PB had the highest K-PP scores (see Fig. 1).

4. Discussion

As expected, participants who strongly believe in paranormal phenomena, gauged with well-known explicit (i.e., question-
naire-based) measures, have more knowledge about paranormal phenomena than participants with a weak belief in the paranormal. Although at first glance implicit PB was uncorrelated with knowledge about paranormal phenomena, looking at implicit and explicit PB in combination revealed that implicit PB had a clear added value. Those participants with a strong explicit and implicit PB had the highest score in the knowledge test, whereas those with a strong implicit but weak explicit PB had the lowest scores. Or put differently, participants with weak implicit PB had similar knowledge scores regardless of whether they had strong or weak explicit PB, but for participants with strong implicit PB, the explicit belief in PB made a difference; i.e., implicit PB had a moderating role on the relationship between explicit PB and performance in the knowledge test (see Fig. 1).

This is clearly in line with research suggesting that the interaction of explicit and implicit concepts has an added value. This phenomenon has been intensively investigated in the domain of self-esteem (e.g., Jordan et al., 2003), where individuals with self-esteem discrepancies show conspicuous (mostly maladaptive) characteristics. For example, individuals with low implicit but high explicit self-esteem (i.e., so-called defensive self-esteem) exhibit strong narcissism (Jordan et al., 2003), whereas individuals with high implicit but low explicit self-esteem (i.e., so-called damaged self-esteem) suffer from high psychological distress. This distress can result in depression or suicidal ideation (e.g., Franck, De Raedt, Dereu, & Van den Abbeele, 2007). Meanwhile, this rationale of implicit/explicit discrepancies has been also applied to other topics such as intelligence, which we will refer to next (Dislich et al., 2012).

Our results are very much in line with Dislich et al. (2012), who were able to convincingly show that the same discrepancy pattern also applies to domains other than self-esteem; i.e., the self-concept of intelligence (SCI). Individuals with a high implicit and high explicit SCI (i.e., consistently high SCI) had the highest test scores in a vocabulary test (which is a good marker of crystallized intelligence),

<table>
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<tr>
<th>Predictor</th>
<th>Step 1</th>
<th>Step 2</th>
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<tr>
<td></td>
<td>b</td>
<td>sr²</td>
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<tr>
<td>1. Explicit PB – NAP</td>
<td>.21†</td>
<td>4%</td>
</tr>
<tr>
<td>2. Implicit PB</td>
<td>.01</td>
<td>&lt;0.1%</td>
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<tr>
<td>3. Explicit PB (NAP) × implicit PB</td>
<td>F(2,70) = 1.58, p = .21; R² = 4%</td>
<td>ΔF(1,69) = 4.55, p = .04; ΔR² = 6%</td>
</tr>
<tr>
<td>1. Explicit PB – TPB</td>
<td>.24†</td>
<td>6%</td>
</tr>
<tr>
<td>2. Implicit PB</td>
<td>.04</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>3. Explicit PB (TPB) × implicit PB</td>
<td>F(2,70) = 2.27, p = .11; R² = 6%</td>
<td>ΔF(1,69) = 1.85, p = .18; ΔR² = 2%</td>
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PB = Paranormal Belief, NAP = New Age Philosophy, TPB = Traditional Paranormal Belief.
† p < .10 (two-tailed).
* p < .05 (two-tailed).
** p < .01 (two-tailed).
*** p < .001 (two-tailed).

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whereas individuals with a high implicit but low explicit SCI had the lowest test scores. Assuming the independence of implicit and explicit associations (see dual-process models; e.g., Strack & Deutsch, 2004), they suggested that implicit SCI moderates the relationship between explicit SCI and test performance.

This moderating role of implicit aspects also seems to apply to PB. Some individuals might explicitly judge themselves as being strong believers in paranormal phenomena, but fail to (implicitly) associate themselves with believing in paranormal phenomena (i.e., they want to believe, but they do not). On the contrary, some individuals might have an implicit (i.e., automatic) belief in paranormal phenomena, but they refuse to admit this belief explicitly because of social desirability tendencies (i.e., they do believe in them, but do not want to let others know). Therefore, the same framework of different types of implicit/explicit combinations might also apply to PB, as has been shown in the present study.

The found results might have also some implications for learning and motivation theories. The dependent measure in the present study was a knowledge-test score. Knowledge is acquired through learning and learning processes are supported by motivation. If someone has for example a positive explicit and implicit attitude towards mathematics, this person will probably also have a higher score on a mathematic test than another person with low explicit and implicit attitudes towards mathematics. Furthermore, the present study found that those participants who have high implicit but low explicit beliefs had the lowest knowledge-test score. In terms of the current example this would mean that people with a positive implicit attitude and a negative explicit attitude towards mathematics would have the lowest test scores. Although this sounds counterintuitive, this effect might be explained by suppression effects. For example, if someone likes mathematics (implicitly), but this person does not want to show this (explicitly), this person might rather perform poorly on a mathematic test on purpose. Therefore, people with inconsistent beliefs or attitudes (especially those with high implicit but low explicit) might purposely perform worse than someone with consistent beliefs (especially those with high explicit and implicit) and this effect might even be stronger for sensitive topics such as paranormal beliefs.

The assumption of the moderating effect from social desirability is further supported by the subscale-specific results of explicit PB. The interaction of explicit and implicit PB has rather been found for the NAP subscale than the TPB subscale. NAP captures rather internally-oriented paranormal forces which are beneficial to individuals (e.g., belief in psi, reincarnation, astrology) and reinforced by personal experience whereas TPB measures beliefs in externally-oriented supernatural forces which are culturally transmitted and reinforced by the individual's culture (Lange et al., 2000). TPB seems to reflect culturally accepted (external) beliefs whereas NAP reflects (internal) beliefs which are prototypically associated with paranormal beliefs. These New Age paranormal beliefs might be also more prone to social desirability than (culturally accepted) traditional paranormal beliefs. Nevertheless, this needs to be addressed in further research and expanded to other domains. It would be interesting whether the discrepancy in explicit and implicit beliefs or attitudes might generalize to other knowledge-based topics and whether this is moderated by the sensitivity of the topic under investigation.

4.1. Limitations and future outlook

The results are limited by a theoretical concept unclarity of PBs which is also reflected in the materials used. PB subsumes many facets such as witchcraft, psi, superstition, and so forth. Future research might try to replicate the results obtained by asking more specifically about subfacets of PB. If social desirability is partly responsible for the patterns found in the current study (i.e., a moderating role of implicit PB on the relation between explicit PB and test performance), then this pattern should predominantly emerge for sensitive topics such as a belief in psi or preognition, but should be weakened for rather insensitive topics such as superstition. In general, future research in the area of PB could greatly prof- it from also using implicit measures to assess automatic aspects.

References


