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Brief report

Thought–action fusion and schizotypy in undergraduate students

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Objective. To examine the relationship between thought–action fusion (TAF) and schizotypy.

Method. In two separate samples of undergraduate students ($Ns = 77$ and 64), correlations were computed between a measure of TAF and indices of schizotypy and fantasy proneness.

Results. Positive correlations were found between TAF and various aspects of schizotypy (i.e. perceptual aberration, magical ideation, schizotypal personality characteristics, disposition to hallucinate). However, correlations between TAF and schizotypy no longer attained significance when controlling for fantasy proneness.

Conclusion. At least in the non-clinical population, the connection between TAF and schizotypy seems to be a by-product of fantasy-prone individuals' tendency to report unusual experiences.

Thought–action fusion (TAF) refers to a cognitive bias that may increase people's sense of responsibility for their intrusions and hence can be regarded as a vulnerability factor for the development of clinical obsessions (e.g. Rachman & Shafran, 1999). There are two types of TAF biases: TAF-morality, which pertains to the belief that unacceptable thoughts are morally equivalent to overt actions, and TAF-likelihood, which refers to the belief that thinking of an unacceptable or disturbing situation will increase the probability that it will happen in the near future.

There is indeed empirical support for the presumed role of TAF in the exacerbation of intrusive thoughts as seen in obsessive-compulsive disorder (OCD). To begin with, Rassin, Merckelbach, Muris, and Spaan (1999) showed that TAF influences participants'

appraisal of the significance of intrusions. Participants were led to believe that thinking about the word 'apple' could result in the administration of an electrical shock to another person. Results indicated that this experimentally induced TAF promoted intrusive thinking in that it resulted in a higher frequency of target thoughts (i.e. thoughts about the word 'apple'), more discomfort and more resistance. Secondly, correlational studies found that TAF is associated with symptoms of various anxiety disorders, but in particular with symptoms of OCD (Muris, Meesters, Rassin, Merckelbach, & Campbell, 2001; Rachman, Thordarson, Shafran, & Woody, 1995; Rassin, Diepstraten, Merckelbach, & Muris, 2001; Shafran, Thordarson, & Rachman, 1996). Furthermore, by means of structural equation modelling Rassin, Muris, Merckelbach, and Schmidt (2000) demonstrated that TAF can be best considered as an antecedent of OCD symptoms. Thirdly, participants with obsessional symptoms have been found to display higher levels of TAF than those without such symptoms (Shafran *et al.*, 1996).

Schizotypy can be defined as the tendency to report schizophrenia-like symptoms. Individuals who are high on this trait are characterized by:

ideas of reference (i.e., incorrect interpretations of causal incidents and external events as having a particular and unusual meaning specifically for the person), [they] are superstitious or preoccupied with paranormal phenomena that are outside the norms of their subculture, [and] believe that they may have magical control over others, which can be implemented directly (e.g., believing that their spouse taking the dog out for a walk is the direct result of thinking it should be done an hour earlier) or indirectly through compliance with magical rituals (e.g., walking past a specific object three times to avoid a certain harmful outcome). (American Psychiatric Association, 1994; p. 641)

Chapman, Chapman, Kwapil, Eckblad, and Zinser (1994) found evidence to suggest that schizotypy increases the risk for developing psychosis. In their study, participants with high schizotypy levels were more likely to suffer from psychosis at 10 years follow-up compared with control participants.

Obviously, there are similarities between schizotypy and TAF. Specifically, schizotypal features such as 'ideas of reference', 'superstition' and 'magical thinking' also seem to constitute the cognitive distortions of TAF. Interestingly, OCD patients relatively often display comorbid schizotypal personality disorder (Baer & Jenike, 1992), and even in non-clinical samples there is a robust correlation between scores on OCD inventories and those on measures of schizotypy (Roth & Baribeau, 2000). However, Rachman and Shafran (1999; p. 83) noted that 'TAF . . . is distinct from the phenomenon in psychosis in that there is full insight that TAF is irrational, "magical", and that thoughts alone cannot produce harmful events'.

Currently, no study can be found in the literature that has directly examined the relationship between TAF and schizotypy. The present investigation was a first attempt to address this issue. In two separate samples of undergraduate students, correlations between a measure of TAF and indices of schizotypy were computed in order to test whether both constructs define a common domain. In both samples, we also included a measure of fantasy proneness as it is known that individuals who score high on this trait display a positive response bias on questionnaires with a bizarre or atypical content (such as measures of TAF and schizotypy), leading to high rates of endorsement of eccentric items (e.g. Merckelbach & Muris, 2001; Merckelbach & Smith, 2003).

Method

Participants

Sample 1 consisted of 77 undergraduate students (43 women and 34 men; mean age = 21.0, $SD = 1.9$, range 18-27) who completed the following measures: the TAF scale (Shafran *et al.*, 1996), the 'magical ideation' and 'perceptual aberration' scales of the Wisconsin Psychosis-Proneness Inventory (WPPI; Chapman & Chapman, 1980), and the Creative Experiences Questionnaire (CEQ; Merckelbach, Horselenberg, & Muris, 2001).

Sample 2 consisted of 64 undergraduates (55 women and 9 men; mean age = 19.5, $SD = 1.7$, range 18-24) who filled out the TAF scale, the Schizotypal Personality Scale (STA; Claridge & Broks, 1984), the Launay-Slade Hallucination Scale (LSHS; Launay & Slade, 1981) and the CEQ.

Questionnaires

The TAF scale contains 19 items addressing the cognitive distortions that involve TAF. Sample items are 'Having a blasphemous thought is almost as sinful to me as a blasphemous action' and 'If I think of myself falling ill, this increases the risk that I will fall ill'. All items are answered on a 5-point scale (0 = disagree strongly, 4 = agree strongly). Scores are summed to obtain a total score, with higher scores reflecting stronger TAF bias.

The WPPI includes six scales that intend to measure different aspects of schizotypy, *viz.* magical ideation, perceptual aberration, social anhedonia, physical anhedonia, impulsive non-conformity and hypomanic personality. In the current study, only the magical ideation and the perceptual aberration scales were used, as longitudinal research has shown that scores on these scales best predict subsequent psychotic symptomatology (Chapman *et al.*, 1994). The magical ideation scale consists of 30 items (e.g. 'Sometimes I have felt the presence of an evil spirit nearby, although I could not see anything', 'Numbers like 13 and 7 have special power') measuring beliefs of causality that, according to the conventional standards of Western culture, are considered as invalid and/or magical (e.g. superstition, thought transmission, precognition, spiritual influences). The perceptual aberration scale contains 33 items (e.g. 'I sometimes had the feeling that my body was abnormal', 'Sometimes I have to touch myself to be sure that I still exist') assessing distorted perceptions of one's own body. Both WPPI scales have a true-false response format. After reversed coding of some items, scores are summed to yield total scores, with higher scores indicating higher levels of magical ideation and perceptual aberration.

The CEQ is a 25-item measure of fantasy proneness. Respondents have to indicate 'yes' or 'no' to statements such as 'As a child, I could very easily identify with the main character of a story or movie', 'When I recall my childhood, I have very vivid and lively memories' and 'I can recall many occurrences before the age of three'. 'Yes' answers are summed to obtain a total score, with higher scores reflecting higher levels of fantasy proneness.

The STA is a questionnaire consisting of 37 dichotomous items that are closely modelled on the DSM criteria for schizotypal personality disorder. Thus, the STA primarily taps the cognitive and social-anxiety aspects of schizotypy (e.g. 'Are you sometimes sure that other people can tell what you are thinking?', 'Do you ever feel that your thoughts do not belong to you?', 'Do you sometimes feel that people are

talking about you?') 'Yes' answers are summed to yield a total score, with higher scores indicating a higher frequency of schizophrenia-like symptoms.

The LSHS is a widely used instrument for measuring the disposition to hallucinate. It consists of 12 items that refer to hallucinatory experiences. Sample items are 'Sometimes my thoughts seem as real as actual events in my life' and 'I have been troubled by hearing voices in my head'. Respondents score each item on a 5-point scale (0 = certainly does not apply, 4 = certainly applies). Scores are summed to obtain a total score, with higher scores reflecting a stronger disposition towards hallucinatory experiences.

Results and discussion

Cronbach's alphas for the TAF scale were .91 and .93 in Samples 1 and 2, respectively, and varied between .72 and .86 for the other questionnaires, indicating that the internal consistency of all scales was satisfactory. In Sample 1, the mean scores on various measures were 17.4 ($SD = 11.1$) for the TAF scale, 4.9 ($SD = 4.1$) for WPPI magical ideation, 3.5 ($SD = 3.7$) for WPPI perceptual aberration, and 6.4 ($SD = 3.7$) for CEQ fantasy proneness. In Sample 2, mean scores were 19.5 ($SD = 12.7$) for the TAF scale, 10.5 ($SD = 5.7$) for STA schizotypy, 11.8 ($SD = 6.7$) for LSHS hallucination predisposition, and 6.3 ($SD = 3.8$) for CEQ fantasy proneness. Note that these scores come close to average values as previously reported for non-clinical samples (Bentall, Claridge, & Slade, 1989; Chapman & Chapman, 1980; Merckelbach *et al.*, 2001; Merckelbach, Rassin, & Muris, 2000; Merckelbach & Van de Ven, 2001; Rassin *et al.*, 2000).

Pearson product-moment correlations between TAF, magical ideation, perceptual aberration and fantasy proneness (Sample 1) showed small but significant positive correlations were found between TAF on the one hand, and magical ideation and perceptual aberration on the other (r s being .27, $p < .05$ and .25, $p < .05$, respectively). Thus, higher levels of TAF were accompanied by higher levels of schizotypal traits. Furthermore, TAF was significantly connected to fantasy proneness ($r = .43$, $p < .001$). When the contribution of fantasy proneness was statistically removed, correlations between TAF and schizotypal traits no longer attained significance. Thus, partial r s between TAF and magical ideation and perceptual aberration were .08 and .11, respectively, when the contribution of fantasy proneness was controlled for.

Correlations among TAF, schizotypy, disposition to hallucinate, and fantasy proneness (Sample 2) indicated that TAF was significantly linked to both schizotypy as indexed by STA and fantasy proneness (r s being .30, $p < .05$ and .31, $p < .05$, respectively), and marginally significantly associated with the disposition to hallucinate ($r = .23$, $p = .06$). When holding fantasy proneness constant, partial correlations between TAF and schizotypy and disposition to hallucinate fell to non-significance (partial r s being .12 and .05, respectively).

The clinical literature offers several examples of studies that found some overlap between OCD and schizotypy (e.g. Sobin *et al.*, 2000; for a review see Enright & Beech, 1997). As TAF seems to be involved in the pathogenesis of OCD and bears resemblance to certain aspects of schizotypy (e.g. magical ideation, superstition), one might hypothesize that TAF is responsible for the covariance of OCD and schizotypy. The present data lend no support to this idea. Correlations between TAF and indices of schizotypy were significant, but small, suggesting that these constructs can be distinguished. Furthermore, these correlations disappeared when the influence of

fantasy proneness was partialled out. Thus, it appears that the connections between TAF and schizotypy are carried by fantasy proneness. A clear preoccupation with unusual cognitions and perceptions is what TAF, schizotypy and fantasy proneness have in common (e.g. Watson, 2001). However, while TAF is outwardly directed in the sense that it has behavioural consequences (checking, neutralizing; e.g. Rassin *et al.*, 1999), schizotypal features do not necessarily manifest themselves in overt action. This, then, might explain why the connection between TAF and schizotypy disappears, once one corrects for fantasy prone individuals' preference for unusual experiences. To sum up, then, our results support Rachman and Shafran's (1999) intuition that TAF is distinct from schizophrenia-like experiences. It should be borne in mind, however, that the present study relied on normal participants, and so the generalizability of the current findings to clinical populations remains to be established. In particular, the precise meaning of the moderate correlations between TAF and fantasy proneness requires further study (see also Rassin, Merckelbach, Muris, & Schmidt, 2001). Perhaps fantasy-prone individuals tend to exaggerate risk probabilities, and this might fuel TAF bias.

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