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The relationship between different types of dissociation and psychosis-like experiences in a non-clinical sample

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Abstract

This study investigates whether detachment-type dissociation, compartmentalisation-type dissociation or absorption was most strongly associated with psychosis-like experiences in the general population. Healthy participants (N=215) were tested with the Dissociative Experiences Scale (DES, for detachment-related dissociative experiences); the Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A, for dissociative compartmentalisation); the Tellegen Absorption Scale (TAS, for non-clinical ‘functional’ dissociative experience); and two measures of psychotic-like experiences, the 21-item Peters et al. Delusions Inventory (PDI-21) and the Cardiff Anomalous Perceptions Scale (CAPS). In multiple regression analyses, DES and TAS but not HGSHS: A scores were found to be significantly associated with PDI-21 and CAPS overall scores. A post-hoc hierarchical cluster analysis checking for cluster overlap between DES and CAPS items, and the TAS and CAPS items showed no overlap between items on the DES and CAPS and minimal overlap between TAS and CAPS items, suggesting the scales measure statistically distinct phenomena. These results show that detachment-type dissociation and absorption, but not compartmentalisation-type dissociation are significantly associated with psychosis-like experiences in a non-clinical population.

Key words: Depersonalisation; Derealisation; Compartmentalisation; Absorption; Psychosis; Psychometric scale

1. Introduction

Several authors have noted a similarity between aspects of dissociative experience and psychotic symptoms, highlighting characteristics such as an altered sense of conscious experience, hallucinations, the disruption or loss of ego-boundaries and the seeming loss of control over one's thinking processes (e.g. Moskowitz, Barker-Collo and Ellson, 2005; Giesbrecht et al., 2007). More recently, studies have suggested that dissociation associated with childhood trauma may play a specific causal role in the development of psychotic symptoms (e.g. Vogel et al., 2013; Sar et al., 2010; Perona-Garcelán et al., 2012c; Schäfer et al., 2012; Varese et al., 2012; Braehler et al., 2013). However, the term 'dissociation' can refer to different types of symptoms and psychological processes that traditionally have been linked but are functionally and theoretically distinct (Brown, 2006) making it unclear as to which form of dissociation may be key in mediating psychotic symptoms. For example, factor analytic studies have distinguished two dissociation subtypes: *compartmentalisation-type dissociation* and *detachment-type dissociation* (Sierra and Berrios, 2000; Brown, 2006; Holmes et al., 2005).

Detachment-type dissociation has been particularly linked to 'depersonalisation' and 'derealisation' (Holmes et al., 2005) – a general feeling of detachment from sensory input, lived experience or 'connectedness' with the world – which accompanies phenomena often found in 'depersonalisation disorder' as well as psychosis and self-disturbances in schizophrenia (Spiegel and Cardena, 1991; Sass et al., 2013). More recently, a neuroimaging study (positron emission tomography) identified similarities in receptor binding profiles between depersonalised states and psychoactive-drug induced psychotic states (Simeon et al., 2014). These psychoactive drugs are exemplified by 'dissociative anaesthetics' such as psilocybin and ketamine which are known to pharmacologically induce psychotic states in

healthy volunteers. Neuro-phenomenological findings point towards an association between psychosis and the detachment-type dissociation seen in depersonalisation disorder: for example, the emotional blunting induced by ketamine is phenomenologically and neurobiologically similar in both cases (Abel et al., 2003).

The notion of compartmentalisation-type dissociation stems from the work of Pierre Janet (1859-1947) who originated the modern concept of dissociation as the compartmentalisation of normally integrated mental functions leading to the loss of conscious control or awareness of specific mental, physical or sensory processes (van der Hart and Horst, 1989). A tendency towards compartmentalisation-type dissociation is often viewed as key to one's ability to respond to hypnotic suggestions (Terhune, Cardena and Lindgren, 2011). Previous research has suggested that the two types of dissociation are unlikely to be explained by the same theoretical accounts and may be cognitively distinct (Sierra and Berrios, 2000; Brown, 2004; Holmes et al., 2005). Studies investigating the links between psychosis-like experience and dissociation, however, have typically not differentiated compartmentalisation from detachment (Allen et al., 1997). In fact, only one study has looked at this directly by investigating possible links between subtypes of dissociation and schizophrenic symptoms. (Vogel et al. 2013). In that study 72 participants with schizophrenia were assessed and it was found that compartmentalisation-type dissociation, in particular amnesia, was associated with negative symptoms whereas detachment-type dissociation demonstrated the strongest association with positive symptoms. In addition, positive schizotypy, in the form of subclinical delusions and hallucinations, has been shown to have a robust and reliable relationship with dissociative experiences when measured with the Dissociative Experiences Scale (DES), a measure of detachment-type dissociation (e.g. Chmielewski and Watson, 2008; Giesbrecht et al., 2007; Merckelbach and Giesbrecht, 2006; Merckelbach et al., 2000).

The latter provides further support for the potential relationship between detachment-type dissociation and psychosis-like experiences/positive schizotypy. However, one study (Connors et al., 2014) reported the use of hypnotic suggestion, usually associated with the production of compartmentalisation-type effects, to induce some very specific types of delusional ideation (delusions of misidentification). Consequently there is conflicting evidence as to whether detachment or compartmentalisation type dissociation is associated with psychotic symptoms.

Another concept linked to dissociation is that of absorption, which relates to the ability to become immersed in thoughts and experiences (Tellegen and Atkinson, 1974). Absorption has several phenomenological similarities with dissociative phenomena given that dissociation involves an altered quality of attention and disattention to components of experience (Holmes et al., 2005). Unlike detachment- and compartmentalisation-type dissociation, the capacity for absorption is not drawn from psychopathology and neither is it considered, in itself, pathological. Nevertheless, high levels of trait absorption have been linked to frank psychotic experiences in patients diagnosed with schizophrenia (Perona-Garcelán et al., 2012a) and hallucination proneness in non-clinical samples (Glicksohn and Barrett, 2003; Perona-Garcelán et al., 2012b) suggesting a possible link with the generation of psychosis-like experience. There is also a large literature on the association between absorption and hypnotic suggestibility, which is measured via the production of compartmentalisation-type dissociative experiences by direct verbal suggestion, though the association is stronger when absorption is measured in a hypnotic context (Council, Kirsch & Hafner, 1986; Milling Kirsch & Burgess, 2000). This raises the question of whether an apparent causal link between dissociation and psychotic symptoms may in fact be more specifically mediated by a propensity to absorption rather than detachment- or

compartmentalisation-type dissociation, as absorption appears to be associated with both types of dissociation.

The purpose of this study is to test which type of dissociation is most associated with psychosis-like experiences in the general population. The main hypothesis is that detachment-type dissociation would show the strongest relationship with positive schizotypy such as subclinical anomalous perceptual experiences and delusional ideation. This approach of studying a general population sample with no self-reported psychiatric disorders has the advantage of covering a wider range of intensity of experience and avoids the problem of researching dissociation in patients who may be taking antipsychotics which can, in themselves, induce a feeling of ‘detachment’ (Mizrahi et al., 2005). It is also important to improve the understanding of the relationship between types of dissociation and psychosis-like experience in the general population to identify mechanisms that may be relevant to the pathogenesis of psychosis. To date, a study which differentiates the various types of dissociation and subclinical psychotic experiences has not yet been conducted with healthy volunteers.

2. Material and Methods

2.1 Participants

Participants were drawn from a general population sample recruited through adverts placed on the gumtree.com website (a ‘small ads’ website targeted at the general population in London) and from an email circular that was distributed to all staff and students at three central London universities. Of those that responded, participants were asked to complete the relevant questionnaires and were asked to attend a screening session where the Harvard Group Scale of Hypnotic Susceptibility: Form A (HGSHS: A) was administered in order to

assess the participants' hypnotic suggestibility. Inclusion criteria were a minimum age of 18 years and high fluency in English. The present sample consisted of 217 participants (126 females) with a mean age of 27.16 ($SD= 9.28$; range = 18 to 67) years. One 16-year-old participant was excluded on this basis. Exclusion criteria were any self-reported previous psychiatric diagnoses or use of psychoactive substances and another participant was excluded on this basis, leaving 215 participants in the final group. This study was ethically approved by the Joint South London and Maudsley and Institute of Psychiatry National Health Service Research Ethics Committee (REC reference: 040/02).

2.2 Measures

All five psychometric measures used in this study are validated and reliable measures of anomalous thinking and experiences in both non-clinical and clinical populations (Angelini et al, 1999). There was one measure for compartmentalisation (HGSHS:A), one for detachment (DES), two for psychotic-like experiences (PDI-21 and CAPS) and finally one measure for absorption (TAS).

2.2.1 Compartmentalisation

The Harvard Group Scale of Hypnotic Susceptibility: Form A (HGSHS: A, Shor and Orne, 1962) provides an index of the extent to which participants experience a series of compartmentalisation-type dissociative experiences through suggestion (Bell et al., 2011; Oakley and Halligan, 2009, 2011, 2013). The HGSHS: A is a well-validated and reliable measure (Cronbach's $\alpha= .79$; Angelini et al, 1999) that includes a short hypnotic induction session followed by a series of 12 suggestions and a de-induction procedure. It can be psychometrically divided into three factors: ideomotor (e.g. eye closure), challenge (e.g. finger lock) and cognitive (e.g. externally-induced hallucination of a fly).

2.2.2 Detachment

Detachment-type dissociation was evaluated by the Dissociative Experiences Scale (DES, Bernstein and Putnam, 1986) which consists of 28 items including three subscales: absorption, amnesia and detachment. The DES is highly internally consistent with a Cronbach's alpha value of .95 as well as good construct validity (Dubester and Braun, 1995).

2.2.3 Absorption

Absorption, or an openness to experiences involving 'total immersion...with indifference to distracting stimuli in the environment' (Tellegen and Atkinson, 1974), was measured by the Tellegen Absorption Scale (TAS, Tellegen and Atkinson, 1974). This scale contains 34 items and five subscales: synaesthesia, altered state of consciousness, aesthetic involvement, imaginative involvement and extrasensory perception (ESP). The TAS has also been shown to be highly internally consistent with a Cronbach's alpha value of .93 (Perona-Garcelán et al., 2012a).

2.2.4 Psychosis-like Experiences

Two scales were employed for assessing psychosis-like experiences in the current sample, which differentiates different types of subclinical psychotic experiences (delusions versus perceptual aberrations/hallucinations). Delusional ideation was measured by the 21-item Peters et al. Delusions Inventory (PDI, Peters et al, 2004), a psychometric scale originally validated in a general population sample and designed for use as an instrument for measuring the range of psychosis-like experiences with a Cronbach's alpha value of around .77 (Jones and Fernyhough, 2007). This scale aims to incorporate the multidimensional nature of

delusions, including subscales for distress, preoccupation and conviction, ranging from suspiciousness to bizarre ideas such as delusions of control.

Anomalous perceptual experience was measured by the 32-item Cardiff Anomalous Perceptions Scale, which is also highly internally consistent (Cronbach's alpha = .87) and has good construct validity (CAPS, Bell et al, 2006). This scale was first designed to measure psychosis-like anomalous perceptions, capturing various experiences from increase in sound intensity to voices conversing with each other. The CAPS includes subscales measuring distress, intrusiveness and frequency. The CAPS was found to be significantly correlated with the PDI-21 (Pearson's $r = .60$, $p < .01$) which offers further support for its construct validity (Bell et al., 2006).

2.3 Procedure

Participants were tested in groups after reading the information sheet and signing the consent form with an opportunity to ask any questions; the HGSHS: A was administered at group level, then each participant was given a questionnaire pack containing the HGSHS:A Subjective and Objective Scales (measures of the effectiveness and intensity of hypnotic suggestion incurred by the HGSHS:A), the PDI-21, the CAPS, the TAS and the DES. Participants were free to complete the forms as they wished, without a particular sequence.

2.4 Analysis

A hierarchical multiple regression was completed to estimate the influence of HGSHS: A, DES and TAS score on the scores of the CAPS and PDI-21 (i.e. testing the predictive power of compartmentalisation-type dissociation, detachment-type dissociation and absorption on delusional ideation and hallucinatory experiences). A post-hoc hierarchical cluster analysis

was completed that included the CAPS Frequency subscale, the DES and TAS to see whether the scales were measuring similar constructs. The analysis of variables for the hierarchical cluster analysis was completed using IBM SPSS version 20 using Ward's method with squared Euclidean distance similarity.

3. Results

The final sample of 215 participants included 90 males (41.9% of the sample) and 125 females (58.1% of the sample). The average age of the participants was 27.14 (SD = 9.22) with an age range of 18 to 67 years. Descriptive statistics for the HGSHS: A Objective Scale, PDI-21, CAPS, TAS and DES are summarised in Table 1, below.

Scale	Mean (SD)
HGSHS: A objective overall score	5.42 (2.58)
DES total	16.89 (14.83)
TAS total	53.58 (23.66)
PDI-21 overall score	6.70 (4.0)
PDI-21 distress	16.44 (13.32)
PDI-21 preoccupation	16.69 (12.97)
PDI-21 conviction	18.93 (13.52)
CAPS overall score	7.69 (6.76)
CAPS distress	17.94 (17.86)
CAPS intrusiveness	20.22 (19.65)
CAPS frequency	17.37 (17.67)

Table 1. Mean overall and subscale scores (SD = standard deviation) for each of the five measures ($N = 215$). HGSHS: A = Harvard Group Scale of Hypnotic Susceptibility; DES = Dissociative Experiences Scale; TAS = Tellegen Absorption Scale; PDI-21 = 21-item Peters et al. Delusions Inventory; CAPS = Cardiff Anomalous Experiences Scale.

To test which of the dissociation-related measures best predicted psychosis-like experiences, hierarchical linear regression models were used to examine the predictive effect of the Harvard Group Scale of Hypnotic Susceptibility: Form A (HGSHS: A, an index of

compartmentalisation-type dissociation), Dissociative Experiences Scale (DES, a measure of detachment-type dissociation) and Tellegen Absorption Scale (TAS) on, alternately, the Peters et al. Delusions Inventory (PDI) and the Cardiff Anomalous Perceptions Scale (CAPS) total scores.

3.1 Predictive variables for the PDI-21

Variables were entered into the hierarchical linear regressions in three blocks to control for the effects of age and sex (first block), to examine the relative effects of HGSHS: A and DES score (second block) and to examine the possible additive effects of TAS to the predictive power of the model. There were no violations of the assumptions of normality, linearity, multicollinearity and homoscedasticity. At Step 1 the model explained 1% of the variance and was not significant ($p = .362$) indicating no significant effect of age and sex. At step two the model explained 22.1% of the variance and was significant ($p < .0005$). At step three the model explained 28.4% of the variance and was significant ($p < .0005$). Coefficients for the individual variables in the final step of the regression model are described in Table 2.

	Standardised β	β	t	p	95% CIs	
					Lower	Upper
<i>Step 1</i>						
Sex	.083	.671	1.194	.234	-.437	1.780
Age	-.060	-.026	-0.864	.388	-.085	.033
<i>Step 2</i>						
Sex	.073	.590	1.177	.240	-.398	1.578
Age	.028	.012	.450	.653	-.042	.066
HGSHS: A	-.010	-.016	-.161	.872	-.205	.174
DES	.469	.126	7.434	<.0005**	.093	.160
<i>Step 3</i>						
Sex	.102	.825	1.701	.091	-.132	1.781
Age	-.008	-.003	-.130	.897	-.056	.049
HGSHS: A	-.010	-.015	-.160	.873	-.197	.168

	Standardised β	β	t	p	95% CIs	
					Lower Upper	
					Lower	Upper
DES	.291	.078	3.930	<.0005**	.039	.118
TAS	.306	.052	4.208	<.0005**	.028	.076

Table 2. Hierarchical linear regression modelling for the PDI-21. HGSHS: A = Harvard Group Scale of Hypnotic Susceptibility; DES = Dissociative Experiences Scale; TAS = Tellegen Absorption Scale; PDI-21 = 21-item Peters et al. Delusions Inventory; CAPS = Cardiff Anomalous Experiences Scale.

3.2 Predictive variables for the CAPS

Variables were entered into the hierarchical linear regressions in three blocks in the same manner as the previous regression model. There were no violations of the assumptions of normality, linearity, multicollinearity and homoscedasticity. At Step 1 the model explained 0.2% of the variance and was not significant ($p = .833$) indicating no significant effect of age and sex. At step two the model explained 25.9% of the variance and was significant ($p < .0005$). At step three the model explained 40.5% of the variance and was significant ($p < .0005$). Coefficients for the individual variables in the final step of the regression model are described in Table 3.

	Standardised β	β	t	p	95% CIs	
					Lower Upper	
					Lower	Upper
<i>Step 1</i>						
Sex	.004	.053	.055	.956	-1.829	1.934
Age	.042	.031	.597	.551	-.070	.131
<i>Step 2</i>						
Sex	-.007	-.101	-.122	.903	-1.731	1.528
Age	.140	.141	2.271	.024*	.014	.192
HGSHS: A	-.001	-.001	-.015	.988	-.315	.310
DES	.517	.507	8.408	<.0005**	.180	.291
<i>Step 3</i>						
Sex	.037	.037	.676	.500	-.969	1.979
Age	.084	.084	1.508	.133	-.019	.143

	Standardised β	β	t	p	95% CIs	
					Lower	Upper
HGSHS: A	.000	.000	-.004	.997	-.282	.280
DES	.245	.245	3.635	<.0005**	.051	.172
TAS	.468	.468	7.053	<.0005**	.096	.171

Table 3. Hierarchical linear regression modelling for the CAPS. HGSHS: A = Harvard Group Scale of Hypnotic Susceptibility; DES = Dissociative Experiences Scale; TAS = Tellegen Absorption Scale; PDI-21 = 21-item Peters et al. Delusions Inventory; CAPS = Cardiff Anomalous Experiences Scale.

3.3 Cluster analyses

It could be argued that the DES and TAS best predict psychosis-like experiences not because of related psychological mechanisms but because they both measure anomalous experience and therefore may simply overlap in what they are measuring. In addition, the DES or at least its absorption scale, has been found (perhaps unsurprisingly) to be strongly correlated with the TAS (Smyser and Baron, 1993). As both the DES and TAS use a frequency of occurrence response rating and the CAPS has a Frequency subscale this was tested by completing two hierarchical cluster analyses looking at the statistical similarity of the items on the DES and CAPS, and the TAS and CAPS. Both used Ward's method with squared Euclidean distance similarity and all item scales were rescaled to an equivalent 0 to 1 scale before analysis to normalise between scale ratings with different ranges.

The results from the hierarchical cluster analysis of the CAPS and DES items are shown in Figure 1. Two main clusters emerge from the analysis. One cluster represents items from the CAPS and another cluster items from the DES with no overlap, suggesting that experiences measured by each scale do not represent significantly similar phenomena. The results from the hierarchical cluster analysis of the CAPS and TAS items are shown in Figure 2. Two main clusters emerge. The first clusters consists of 25 CAPS items, the second cluster has all

of the items from the TAS plus the remaining 7 CAPS items. These items typically include the more subtle or psychological items on the CAPS rather than more straightforward sensory experiences.

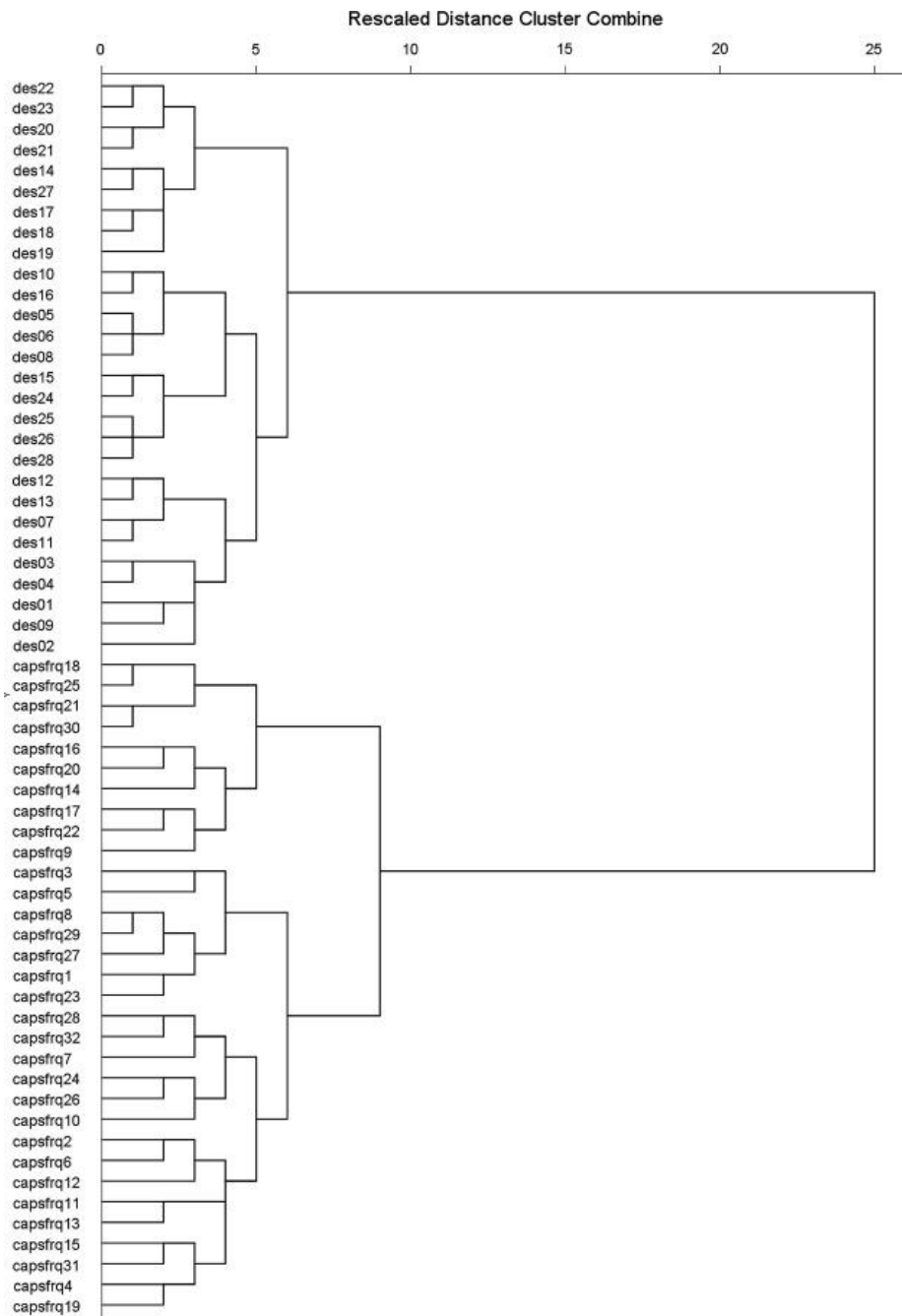


Figure 1. Dendrogram of hierarchical cluster analysis of CAPS Frequency and DES items. DES = Dissociative Experiences Scale; CAPS = Cardiff Anomalous Experiences Scale. The codes to the left of the dendrogram refer to the DES and CAPS item numbers.

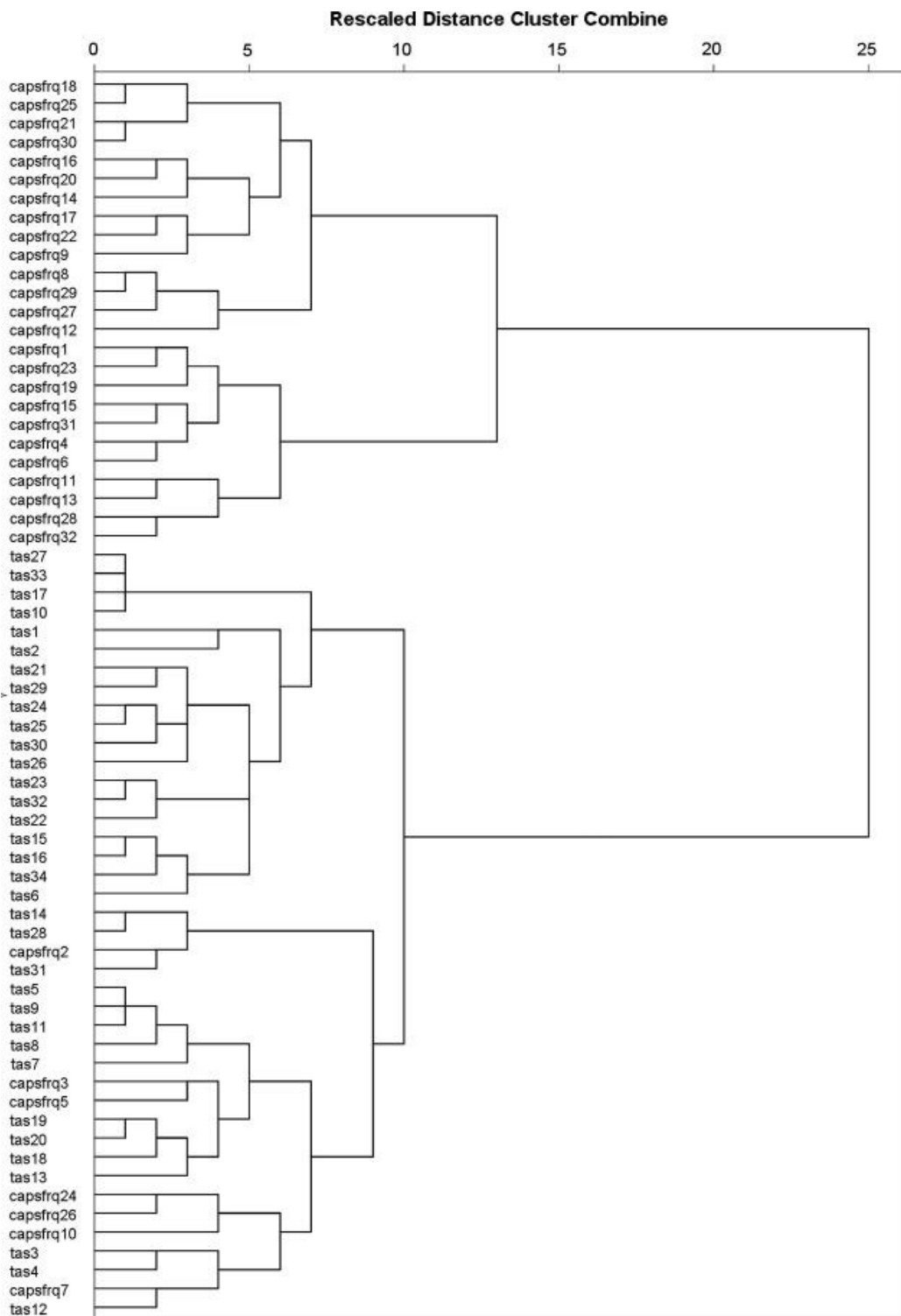


Figure 2. Dendrogram of hierarchical cluster analysis of CAPS Frequency and TAS items. TAS = Tellegen Absorption Scale; CAPS = Cardiff Anomalous Experiences Scale. The codes to the left of the dendrogram refer to the TAS and CAPS item numbers.

4. Discussion

This study investigated which of three forms of dissociation - detachment, compartmentalisation and absorption - would predict the presence of psychosis-like experiences in a non-clinical general population sample. The results indicate that detachment-type dissociation and absorption both predicted levels of delusional ideation and anomalous perceptual experiences. These findings did not fully support the *a priori* hypothesis that the strongest association would only exist between detachment-type dissociation and subclinical psychotic symptoms. Consistent with our hypothesis, however, compartmentalisation-type dissociation did not predict psychosis-like experience. A post-hoc cluster analysis indicated that detachment-type dissociation and absorption are largely distinct from psychosis-like experience and do not reflect similar constructs. This suggests that psychosis-like experience is more likely to be mediated by the presence of dissociative experiences along the depersonalisation-derealisation spectrum in a non-clinical population and that these are likely to be distinct psychological processes and not an artefact of the scales measuring the same concept.

The relationship or the conceptual overlap between absorption, detachment-type dissociation and compartmentalisation-type dissociation must be considered. As mentioned previously, detachment is only one of the three subscales in the DES, the other two being absorption and amnesia (similar to compartmentalisation to a certain extent). However, detachment is related to absorption (Tellegen and Atkinson, 1974). It could even be proposed, although speculatively, that the nature of absorption as a mediating factor could vary depending on whether the individual is already psychotic or is in a pre-psychotic or psychosis-prone stage.

One of the key questions arising from these results concerns the relationship to psychotic and dissociative symptoms in clinical samples. Previous studies on patients with psychosis have suggested that dissociative experiences associated with (typically childhood) trauma mediate the presence of psychotic symptoms in adulthood (e.g. Vogel et al., 2013; Sar et al., 2010; Perona-Garcelán et al., 2012c; Schäfer et al., 2012; Varese et al., 2012; Braehler et al., 2013). Generalised to clinical samples, our results may suggest a pathway from early trauma to psychosis mediated, at least in part, through a detachment-type dissociative process. Our results are consistent with Vogel et al.'s (2013) findings in a clinical sample that detachment-type dissociation most significantly predicted positive symptoms. However, the extent to which the association between detachment-type dissociation and psychotic-type phenomena might be related to different methods of psychological coping, genetic factors or neuropsychological differences, remains unclear. It is also not clear to what extent the effects seen in this study may be related to trauma, given that the majority of the population have experienced a traumatic event (Breslau et al., 1998; Kessler et al., 1995) but only a minority go on to develop mental health difficulties (Bonanno et al., 2010). Trauma was not explicitly measured in the current study, although trauma is observed in healthy participants (e.g. Frans et al., 2005). Additional studies looking at both compartmentalisation- and detachment-type dissociation in psychotic patients and non-clinical controls while testing for the presence of childhood trauma, would provide a more complete understanding as to a potential mediating link between type of dissociation, childhood experience and clinical outcome.

One of the limitations of this study is that as the results are drawn from a cross-sectional design it is not possible to determine the direction of causality. It may be that psychosis-like experience subsequently raises the chance of experiencing dissociative episodes: individuals scoring high in subclinical psychotic symptoms could be more prone to absorption and

detachment-type dissociation because such experiences are inherently attentionally salient and seem strange or unreal, or the reverse, or that both occur simultaneously. Although the sample used for this study included a wide range of ages, sources, and was balanced between sexes, the fact that dissociative experiences seem to be influenced by culturally acquired meanings, expectancies and attributions (Seligman and Kirmayer, 2008) suggests that the results presented here, and indeed other studies from Western samples, may not always fully translate to other cultural settings.

5. Conclusions

The results of this study suggest that detachment-type dissociation and absorption, but not compartmentalisation-type dissociation, are significantly associated with psychosis-like experiences in a non-clinical population. This finding has implications in clinical settings, such as psychosis screening. Furthermore, at least for anomalous perceptual experiences, this association does not seem to be an artefact of phenomenological overlap as items on the detachment-type dissociation scales and the measure of anomalous perceptions (CAPS) form largely distinct statistical clusters. In the non-clinical population, as in the clinical population, detachment-style dissociation seems to be a key mediator of psychosis-like experiences, although further work is needed to examine their causal relationships to one another and with childhood trauma.

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