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Acute psychoactive effects of intravenous ketamine during treatment of mood disorders: Analysis of the Clinician Administered Dissociative State Scale

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Abstract

Introduction: Ketamine has rapid-acting antidepressant effects. Frequently, ketamine administration also causes acute psychoactive effects – in trials, these effects are commonly measured using the Clinician Administered Dissociative State Scale (CADSS). However, the CADSS was not designed for this specific purpose, having been validated in other clinical contexts, and anecdotally does not appear to fully capture ketamine's acute psychoactive effects.

Methods: Data were obtained from 110 individuals with mood disorders (predominantly major depressive disorder) who underwent intravenous ketamine infusion. An exploratory factor analysis (EFA) was performed on the CADSS, along with assessment of internal consistency. Qualitative methods were used to conduct in-depth interviews with a subset of these participants to identify key features of the acute ketamine experience, including aspects that may not be captured by the CADSS.

Results: The mean total score of the CADSS was low at 7.7 (SD 9.2). Analysis of internal consistency showed a Cronbach's alpha of 0.74. Five CADSS items had low correlations with the total score. EFA led to a one-factor solution containing 16 items. Five of the six highest loading items involved perceptual disturbances, either of time or sensation. Qualitative analyses of 10 patient narratives revealed two phenomena not captured on the CADSS: disinhibition and a sense of peace.

Limitations: This study was limited by the absence of other ratings of the participants' experience.

Conclusion: Findings suggest that the CADSS partially captures the acute effects of ketamine administration. Further research may seek to validate a revised version of the CADSS that more accurately measures these effects.

Keywords

Ketamine; Dissociative; CADSS; Phenomenology; Antidepressant

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1. Introduction

Since 2000, a series of randomized controlled trials has demonstrated that subanesthetic doses of ketamine have rapid-acting anti-depressant effects in patients with both unipolar and bipolar depression (Berman et al., 2000; Diazgranados et al., 2010; Murrough et al., 2013; Sos et al., 2013; Zarate et al., 2006). The mechanism of action of this antidepressant effect is thought to be ketamine's antagonism of the N-methyl-D-aspartate (NMDA) receptor (Li et al., 2010), though other mechanisms may also be at play (Zanos et al., 2016).

At the doses most commonly examined for the treatment of mood disorders in clinical settings (0.5 mg/kg intravenously over 40 min), ketamine also produces acute psychoactive effects (i.e. temporary changes in perception, alertness) that generally subside within an hour post-infusion. Ketamine has been categorized as a 'dissociative anesthetic' (Haas and Harper, 1992), and these effects have been described as dissociative side effects - however, ketamine has also been used as a model for the rapid induction of transient psychotic symptoms (Krystal et al., 2005). The Clinician Administered Dissociative State Scale (CADSS) is the most widely used instrument to assess these acute psychoactive effects of ketamine administration in past trials for mood disorders (Bremner et al., 1998).

Anecdotal evidence derived from the experience of the authors' use of ketamine in several clinical trials (Singh et al., 2016; Valentine et al., 2011; Wilkinson et al., 2017) as well as in a general clinical setting suggests that the CADSS does not adequately capture the acute psychoactive experience that occurs when patients with depression receive subanesthetic doses of ketamine seen in previous trials. For example, a number of patients who score zero, or close to zero on the CADSS 40 min into a ketamine infusion remark that they feel "out of it", but that the questions of the CADSS do not accurately reflect what they are experiencing. Average scores on the CADSS in published data are lower than those reported in the initial validation of the CADSS, despite the potent acute psychoactive effects of ketamine.

The initial version of the CADSS was a 27-item scale that included both clinician administered questions and clinician observations, all scored on a Likert scale from 0 to 4. In a clinically diverse adult clinical sample (N = 124), the CADSS was found to have high inter-rater reliability ($r = 0.92$, $p < 0.01$) and internal consistency (Cronbach's $\alpha = 0.94$) (Bremner et al., 1998). This sample included adults with PTSD ($n = 68$), schizophrenia ($n = 22$), and affective disorders ($n = 15$). Notably, scores on the CADSS were significantly higher for the PTSD cohort ($M = 19$, $SD = 118$) than the schizophrenia cohort ($M = 3.7$, $SD = 5.2$) and the affective disorders cohort ($M = 7.5$, $SD = 9.6$). The CADSS was further used to assess dissociative symptoms in the patients with PTSD before and after exposure to a traumatic memory, with a significant elevation in scores from baseline following the exposure. There has been no subsequent research assessing its validity to measure dissociation in other clinical contexts, nor for the measurement of the acute experience of ketamine administration.

In summary, the CADSS was not designed specifically for assessing the acute psychoactive effects of ketamine, nor has it been subsequently validated for this purpose, and anecdotally

it does not appear to achieve this purpose effectively. It is important to be able to accurately assess the acute psychoactive effects of ketamine for several reasons. First, there is significant interest whether the intensity of the acute ketamine experience is correlated with the ultimate antidepressant response (Luckenbaugh et al., 2014; Sos et al., 2013). Second, accurately quantifying the extent of the acute experience by both active and placebo participants in clinical trials is important to assure high quality blinding in trials using an active control comparator (i.e., midazolam). Finally, as newer glutamatergic antidepressants are developed, a goal may be to develop an effective antidepressant that does not cause the same degree of acute side-effects; achieving this aim is contingent on accurate assessment of these phenomena.

The aim of this study was therefore to 1) determine whether the current version of the CADSS was capturing the acute psychoactive effects of ketamine administration, and 2) further define aspects of this experience not measured by current scales. To this end, we performed an exploratory factor analysis (EFA) of CADSS data from 110 participants who underwent intravenous ketamine infusion at 0.5 mg/kg over 40 min. We also conducted a qualitative assessment to explore the dissociative experience from first-person patient narratives. Our use of mixed methods allowed us to identify ways that CADSS is successful in assessing the acute effects of ketamine, as well as ways it assesses phenomena that are not salient aspects of this experience, and finally, identify aspects of the ketamine experience described by participants but not currently captured on the CADSS.

2. Method

2.1. Data sources and subjects

We utilized existing quantitative data from several sources: a randomized controlled trial of ketamine versus saline placebo, which included a subsequent open-label phase (N = 67) (Singh et al., 2016), an open-label trial of ketamine (N = 16) (Wilkinson et al., 2017), and data from the Interventional Psychiatric Services at X University (N = 27) that provides ketamine as clinical treatment to patients refractory to other forms of therapy and uses the CADSS as a standard clinical safety measure. Inclusion and exclusion criteria from previous studies has been published elsewhere (Singh et al., 2016; Wilkinson et al., 2017). For the clinical sample, no specific inclusion/exclusion criteria were applied other than clinically appropriate for ketamine treatment. Scale raters for each study were required to have at least a bachelor's level of education and raters were required to have specific training for each study. IRB approval was obtained for the collection of qualitative data, and the IRB was consulted regarding use of the data collected from clinical services, and deemed this data to be exempt from review. After pooling data, we obtained the CADSS scores at the 40-min infusion point for 110 individual subjects. In ketamine trials, this is the common assessment point during which the acute effects are most pronounced. The diagnoses of the sample are listed in Table 1.

2.2. Measures

The CADSS is a scale used to measure dissociative states developed by Bremner et al. (1998). The version in use for ketamine trials has 23 clinician-administered items, each

scored from 0 (not at all) to 4 (extreme). Items assess impairment in body sensation, perception of time and environment, memory impairment, and feelings of unreality. The CADSS has been used to assess the acute psychoactive effects of keta-mine in a number of randomized-controlled trials (Diazgranados et al., 2010; Murrough et al., 2013; Singh et al., 2016; Zarate et al., 2006).

2.3. Statistical analysis

Statistical analyses were performed using the SPSS statistical software program version 22. Data were assessed for non-normality and missing values. Missing data were found to be minimal, less than 2% for any item. Regarding non-normality, skewness (1.4, SE = 0.23) and kurtosis (1.3, SE = 0.46) were found to be in the acceptable range for tests assuming a normal distribution. Kaiser-Meyer-Olkin measure of sampling adequacy was 0.849, above the recommended threshold of 0.6 (Dziuban and Shirkey, 1974), and Bartlett's Test of Sphericity was significant at $p < 0.001$. An EFA was conducted, using oblique (Oblimin) rotation as factors were expected to be intercorrelated. The choice of the number of factors for the eventual solution was based on assessing the eigenvalues of factors generated, and whether one or more factors had significantly higher eigenvalues than subsequent factors—this was confirmed visually through inspection of a scree plot. Internal consistency was calculated using Cronbach's alpha, and each individual item was assessed for its effect on internal consistency when removed from analysis, as well as its correlation with the total score.

2.4. Qualitative data collection

We conducted semi-structured interviews with 10 of the participants, organized around open-ended questions designed to elicit narratives of the acute ketamine experience. Participants were allowed to freely explore issues going beyond simply responding to the specific questions (Quinn Patton, 2001). The mean age (SD) of the interviewees was 52.6 (13.6). Most (7/10) were female, and most (9/10) had unipolar major depressive disorder, with one having bipolar disorder. The interviews were conducted by co-author GVS, who had no established treatment relationship with any of the participants. A summary of the interview questions is included under Fig. 1. We elected to use a sub-sample rather than the entire sample, as semi-structured interviews produce large volumes of data for each individual participant, and analysis is typically reliant on much smaller samples than for quantitative studies. Convenience sampling was used, with recruitment of participants who were available to participate in this portion of the study being included.

2.5. Qualitative analysis

Interviews were recorded, and all transcribed texts were analyzed in QSR Nvivo, a software application that facilitates qualitative analyses (QSR International, 2014). We used inductive thematic analysis, allocating descriptive labels to specific sections of the text. This process, which enabled the extraction of a code list with relevant quotes from the transcripts, required several iterations of engaging with the texts. The codes with quotes were then revisited to allow for the development of themes - thus based on the descriptions provided by the participants, and not according to a pre-determined theoretical framework (Saldaña, 2015). This approach was chosen to ensure that the findings of the qualitative analysis represented

participants' experience, rather than the imposition of existing assumptions regarding the treatment experience. The analysis was reviewed by co-author STW at several stages. Results were tested with participants at several stages to ensure salience of the emerging thematic hierarchy in relation to participants' experiences.

2.6. Comparative analysis

The findings of the quantitative analysis were compared and contrasted. Instances of overlap between quantitative and qualitative findings were highlighted. We further highlighted instances where the themes emerging from the qualitative analysis were not captured by the quantitative data. Similarly, we highlighted instances where themes that emerged in the quantitative data were not clearly reflected in qualitative descriptions.

3. Results

Sample characteristics are described in Table 1. The mean overall score on the CADSS was low (6.2, SD = 9.1), with 27 (25%) of participants having scores of zero (see Table 2 for details of individual items). An EFA generated a single factor solution containing 16 of the 24 items, which described experiences of altered sensory and time perception, depersonalization, and memory changes. Prominent themes in the qualitative analysis included altered sensory and time perception, as well as disinhibition, a sense of peace, and unusual bodily sensations.

3.1. Exploratory factor analysis

An EFA, using principal axis factoring and oblimin rotation, identified one factor with an eigenvalue of 6.9, with seven factors with eigenvalues between one and two. This was confirmed visually by scree plot, which showed a sharp slope from the first to second factor. This single factor solution generated a factor - "dissociation" that accounted for 30% of the variance. This factor contained 18 items, of which 16 had loadings greater than 0.35, and were thus considered indicators of this single factor (Osborne and Costello, 2009). Items 13, 17, 19, 21 and 23 were not included in this factor and each one increased the internal consistency of the scale when removed, and had low correlations with the total score (ranging from 0.14 to 0.34). Cronbach's alpha for this single factor was 0.71. Both a one- and two-factor solution were tried and interpretability of results were compared; a two-factor solution identified a second factor that correlated negatively with items 7 and 16, and positively with item 23, which was endorsed by only a single participant. Hence the one factor solution was considered to better fit the data.

The items in this one-factor solution corresponded to inter-related themes of dissociative experience (See Table 3). Five of the six highest loading items (1, 15, 9, 11, 15) describe experiences of changes in sensory perception and perception of time (See Table 1 for item descriptors). Another theme relating to depersonalization experiences were items 3, 4, 5, 6 and 20. There were also two items of experiences relating to memory – items 22 and 14. Items 7 and 8 had the lowest factor loadings (0.35 and 0.32 respectively) and did not appear to relate to any of these three themes.

3.2. Qualitative comparisons

The EFA findings were compared with qualitative descriptions of participant experience. In the course of qualitative analysis, participants identified a number of key themes related to their experience. Four prominent themes were repeatedly emphasized: unusual bodily sensations, a sense of peace, disinhibition, and a sense of altered perception. The most prominent theme was altered time and sensory perception and was closely related to the dominant themes in the primary factor. The other themes in the qualitative analysis were less related.

3.2.1. Altered time and sensory perception—The theme of altered perception was commonly endorsed. Six out of ten participants described experiences that corresponded to items with high correlations (> 0.6) to the total score for the CADSS – specifically, items 1, 2, 9 and 15. For example:

Um, well it's like being put under you, there's a state of a kind of alternate reality, you're awake, you're aware of things, but you're not. I could hear things in the room, I knew people were there, I could see people, but you kind of go in this, just kind of half asleep mode, and so I was like halfway under but I was aware and I had thoughts.

(Participant 8)

And,

Oh, it's, I feel while I'm getting it, kind of spacey and out of it. It's not, um, it's not like pleasant or unpleasant, it's just that.

(Participant 7)

Within this theme, participants mainly described a sense of not being aware of time, and it being slowed, with no participants describing a sense of time being accelerated. This corresponds to item 13 being seldom endorsed by participants and having a low correlation with the total score. Similarly, some participants described an enhancement in their perception, with one participant saying how they “*got very observant of things*”, and another describing a capacity to hear “*multiple depths*” when listening to music. These experiences appear to be broadly related to item 17, although only participant 2 endorsed this item in the qualitative analysis, and item 17 on the CADSS showed poor correlation with the total score in the quantitative analysis.

3.2.2. Unusual bodily sensations—Although four out of ten participants described unusual bodily sensations, these were distinct from the descriptions contained in items 21 and item 7. However, two participants described experiences that were consistent with the anchor contained in item 7 for a score of 1 (“*Mild, I have a vague feeling that something about my body has changed, but I can't say exactly what it is.*”) – such as a sense of feeling heavy, or having a strange sensation in a single limb. More commonly, participants simply described feeling “woozy”, nauseous or light-headed.

3.2.3. A sense of peace—A prominent aspect of the ketamine experience that was endorsed by a number of participants was a sense of peace. This included both a cognitive

and emotional dimension. Four participants clearly described an overt improvement in mood:

That place was um, serene and peaceful, and um, just such a burden was lifted from me. And it was refreshing to feel something that was such a change from what I normally feel.

(Participant 6)

Three participants described changes in their thoughts during this experience, including a sense of greater optimism about their problems:

I had thoughts and could think of things and I could steer the thoughts in certain ways and stuff. But they're all good. I remember I had worries about certain things like let's say if it was finances or stuff like that, I kind of thought it out and remember thinking about it when I was under. And it wasn't a problem. It seemed like it was less of an issue now when I thought about it, when I was under and stuff like that, I remember thinking about my parents who passed away probably 15 years prior and I don't know, just coming to a calm about that.

(Participant 8)

The above participant was able to use the ketamine experience to work through some of his concerns. Another participant described the experience as a 'release' where 'everything came together'. Yet another participant described the utility of mentally returning to the experience of the infusion in the days and weeks following it as a way to regain peace and serenity.

3.2.4. Disinhibition—Participants spoke of changes or concerns about how they might have been behaving during the infusion. Three participants remembered being more talkative and less serious, and an accompanying sense of self-consciousness:

I was afraid I would sound intoxicated, and... kind of the way you do, like I don't drink, or do drugs, but it's almost how I would picture, well I have drink and done drugs, um, but it's how you would be if you were drinking or doing drugs, like feeling buzzed and wondering, am I making sense?

(Participant 4)

And in another case:

When I actually sort of came out of it and came down, um, you know, Dr. W said, how do you feel? And this is kind of out of character for me, but I said, I don't give a s..t about anything. And then, he said, well what do you mean? I said, well I don't, I'm not worried about anything, I don't care, you know, do what you want.

(Participant 6)

4. Discussion

A number of key findings emerged from this study, several of which support our hypothesis that the CADSS has limitations as a tool to measure the acute effects of ketamine

administration. The average scores on the CADSS in our sample were substantially lower than scores reported in the initial validation for patients with PTSD (Bremner et al., 1998) with a quarter of the subjects not endorsing any specific item on the scale. This could either be due to the fact that the scale, designed to quantify dissociative symptoms associated with PTSD, is not truly capturing ketamine's psychoactive effects as experienced by the patient, or it could indicate that the effects of ketamine are simply less dramatic than that which occurs in PTSD. However, in our EFA, we identified a single-factor solution, which excluded 5 items that correlated poorly with the total score in our sample, and which improved the internal consistency of the scale when removed. Further, both qualitative analysis and the anecdotal experience of the researchers suggests that even participants who had low scores on the CADSS did in fact experience prominent acute psychoactive effects. This supports the view that at least part of the scale is attempting to assess phenomenology that is not prominent in the acute ketamine experience.

In our qualitative analysis we identified a number of dimensions of experience which could be categorized in three ways. A) There were aspects of the qualitative experience which overlapped with items in the CADSS that were included in our single-factor solution; B) There were aspects which were not captured on the CADSS at all, and C) There were aspects which appeared similar to items on the CADSS, but these items were seldom endorsed by patients, including those who described this experience during qualitative interviews.

These findings provide an additional perspective on our quantitative analysis. The aspects of the qualitative experience that overlapped with items in the CADSS provide additional support that these are valid items for assessing the psychoactive effects of ketamine. This applies to a total of 8 items that appear to describe 'altered perception'. We would further argue that the finding of aspects to the ketamine experience that were not reflected in the CADSS is consistent with our anecdotal experience of patients with low scores on the CADSS nevertheless endorsing a prominent psychoactive experience. This suggests that the development of additional items may be needed to more completely assess the psychoactive effects of ketamine in a quantitative manner. Further, the fact that there were items which appeared to reflect participants experiences, but which were seldom endorsed, suggests that these items may benefit from being adjusted or reframed to better resonate with the specific effects of ketamine. These items primarily described unusual bodily sensations; however, whereas the CADSS asks about the specific experiences of feeling unusually large or small, or disconnected, participants had less specific experience of feeling heavy, or simply that their body was different in some way.

To our knowledge, this is the first study to examine the psycho-metric properties of the CADSS when used in ketamine treatment. Further, this is the first study to explore additional aspects of the ketamine experience in an open-ended manner. However, a number of existing scales exist that attempt to quantify some of phenomena described by participants in our study. Prior attempts at assessing related experiences similar to the 'sense of peace' described in our study include the use of the Mysticism Scale (Hood, 1975). This scale appears to capture a component of the acute ketamine experience, and was further found to correlate with motivation to quit cocaine in a cocaine dependent individuals who underwent

ketamine infusions (Dakwar et al., 2014). The Mysticism Scale includes statements like “*I have had an experience in which a new reality was revealed to me*” and “*I have had an experience in which I felt that all was perfection at that time*”. Relatedly, the APZ (‘Altered States of Consciousness, in German) questionnaire seeks to examine altered states of consciousness, including the concept of “*oceanic boundlessness*” with items like “*I had the feeling everything around me was somehow unreal*” (Dittrich, 1998). This scale has been used to quantify aspects of the ketamine experience in human psychosis models (Vollenweider et al., 2000).

Similarly, there is precedent for the assessment of disinhibition - for example, the Drinking-Induced Disinhibition Scale (DIDS) assesses acute disinhibition in the context of alcohol intoxication across three dimensions, dysphoria, euphoria, and sexual disinhibition (Leeman et al., 2007). Participants are asked to endorse items including ‘Expressing more optimism than when not drinking’ and ‘Greater feelings of personal freedom than when not drinking’ – if reframed, these items may be promising candidates for additional ways to assess the ketamine response.

The categories of experience identified in our study correspond to the biological effects of ketamine. For example, ketamine has been shown to induce deficits of auditory and visual processing in human experimental paradigms, inducing errors in a performance task with associated increase in mismatch-negativity (Umbricht et al., 2000). The experiences of disinhibition and depersonalization may reflect alterations in consciousness through ketamine’s effects on default-mode network connectivity (Bonhomme et al., 2016). The experience of a ‘sense of peace’ may represent the phenomenologic correlate of a decrease in self-reference – a further consequence of both decreased default mode connectivity, and increased reactivity in the anterior cingulate cortex (Lehmann et al., 2016).

Our study is limited in that we were not able to obtain additional measures of patient experiences during the immediate period following ketamine exposure. Further, we were not able to obtain outcome data for participants in our sample, which would have allowed us to explore the additional question of whether the items identified in our EFA were relevant to participants clinical outcomes. We made use of a sample of convenience for both our qualitative and quantitative analysis, potentially impacting the generalizability of our findings. Although we used a standardized approach in conducting our EFA, a different factor solution may exist in a sample with a higher mean score on the CADSS. The average score on the CADSS in our sample was low, with a number of participants scoring zero – however, this did not skew the distribution of the data, and is consistent with existing clinical impressions of the CADSS not detecting key aspects of the acute psychoactive effects of ketamine.

Taken together, these results provide further support for the hypothesis that the CADSS is not an optimal tool for assessing the acute psychoactive effects of ketamine. We extend this idea by further hypothesizing that a more suitable tool for assessing ketamine would A) Include items assessing additional phenomenology, such as disinhibition and a sense of peace; B) would exclude a number of items currently assessed on the CADSS which have low yield, C) would reframe some items on the CADSS when used in this population.

Further research may seek to validate a revised version of the CADSS based on these findings.

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- 1) I'd like to talk about the time(s) when you received ketamine. What was that experience like?
- 2) In what ways did it make you feel good right away?
 - a. Feeling of elation?
 - b. A weight being lifted?
- 3) In what ways did it make you feel unusual or different?
 - a. Stoned?
 - b. Feeling high?
 - c. Things seemed less serious?
- 4) In what was, in any, was it an uncomfortable experience?
 - a. Unsure if you were making sense?
 - b. Did you know who you were and what was going on?

Fig. 1.
Sample questions from semi-structured interview.

Table 1

Demographic and clinical characteristics of subjects in quantitative analysis (N = 110).

	Overall sample (N = 110) Mean (SD) / N (%)	Singh et al. (2016) (N = 67)	Wilkinson et al. (2017) (N = 16)	Unpublished data (N = 27)
Age	45.4 (14.0)	43.9 (11.0)	42.7 (13.7)	50.7 (19.8)
Male	39 (35.5)	22 (32.8)	4 (25)	13 (48.1)
Diagnosis				
Major Depressive Disorder	104 (94.5)	67 (100)	16 (100)	21 (77.8)
Bipolar Disorder	1 (0.9)	0 (0)	0 (0)	1 (3.7)
Other	5 (4.5)	0 (0)	0 (0)	5 (18.5)
Race				
White	93 (84.5)	53 (79.1)	16 (100)	24 (88.9)
Black	12 (10.9)	12 (17.9)	0 (0)	0 (0)
Other	5 (4.5)	2 (3.0)	0 (0)	3 (11.1)

Table 2

Item characteristics on CADSS.

Item	Mean	SD	Cronbach's alpha of scale without this item	Correlation with total score
1 – things moving in slow motion	0.53	0.95	0.72	0.72
2 – things seem unreal	0.84	1.14	0.72	0.74
3 – an experience separating you from what is happening	0.36	0.82	0.72	0.64
4 – looking at things outside your body	0.23	0.56	0.73	0.58
5 – watching the situation as an observer or spectator	0.34	0.70	0.73	0.64
6 – disconnected from your own body	0.42	0.80	0.73	0.60
7 – sense of your body feel changed	0.42	0.84	0.73	0.45
8 – people seem motionless, dead, mechanical	0.14	0.51	0.74	0.40
9 – objects look different than expected	0.46	0.90	0.72	0.72
10 – colors diminished in intensity	0.17	0.53	0.74	0.38
11 – see things through tunnel, wide-angle lens	0.23	0.66	0.73	0.64
12 – interview taking longer than expected	0.18	0.44	0.74	0.54
13 – things happening very quickly	0.11	0.53	0.74	0.25
14 – things which happened that you cannot account for	0.28	0.80	0.74	0.58
15 – spaced out or lost track of time	0.82	1.37	0.71	0.83
16 – sounds disappeared or become stronger	0.33	0.68	0.73	0.49
17 – things seem very real	0.18	0.68	0.74	0.34
18 – looking at the world through a fog	0.36	0.67	0.73	0.44
19 – colors brighter than expected	0.10	0.41	0.74	0.14
20 – feel confused about who you really are	0.15	0.50	0.74	0.44
21 – different parts of yourself don't fit together	0.08	0.38	0.74	0.31
22 – gaps in your memory	0.41	0.91	0.72	0.71
23 – more than one identity	0.01	0.09	0.74	0.31
Total	6.2	9.1		1

Table 3

Items ranked (in descending order) by factor loading for each theme.

Altered visual and auditory perception	Altered time perception	Depersonalization	Memory
9 – objects look different than expected	15 – spaced out or lost track of what was going on	5 – watching the situation as an observer or spectator	22 – gaps in your memory
2 – things seem unreal	1 – things moving in slow motion	6 – disconnected from your own body	14 – things which happened that you cannot account for
11 – looking through tunnel or wide angle lens	12 – interview taking longer than expected	4 – looking at things from outside your body	
18 – looking at the world through a fog		3 – an experience separating you from what is happening	
16 – sounds disappeared or become stronger		20 – feel confused about who you really are	
10 – colors diminished in intensity			