Dissociation and hallucinations in dyads engaged through interpersonal gazing

Giovanni B. Caputo

DIPSUM, University of Urbino, via Saffi 15, 61029 Urbino, Italy

ARTICLE INFO

ABSTRACT

Interpersonal gazing in dyads, when the two individuals in the dyad stare at each other in the eyes, is investigated in 20 healthy young individuals at low illumination for 10-min. Results indicate dissociative symptoms, dysmorphic face perceptions, and hallucination-like strange-face apparitions. Dissociative symptoms and face dysmorphia were correlated. Strange-face apparitions were non-correlated with dissociation and dysmorphia. These results indicate that dissociative symptoms and hallucinatory phenomena during interpersonal-gazing under low illumination can involve different processes. Strange-face apparitions may characterize the rebound to "reality" (perceptual reality caused by external stimulus and hallucinatory reality caused by internal input) from a dissociative state induced by sensory deprivation. These phenomena may explain psychodynamic projections of the subject's unconscious meanings into the other's face. The results indicate that interpersonal gazing in dyads can be an effective tool for studying experimentally-induced dissociative symptoms and hallucinatory-like apparitions.

© 2015 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

The dissociative disorders are characterized by a discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour (Spiegel et al., 2013). Dissociative states involve symptoms of gaps in memory not caused by ordinary memory loss, out of body experiences and other distortions of the sense of one's own body, distortions in visual perception, such as seeing things as if they are in a tunnel or seeing things in black and white, and fragmentation of the sense of the self (Bremner et al., 1998; Holmes et al., 2005). Depersonalization is an experience in which the individual feels a sense of unreality and detachment from themselves. This is often accompanied by the symptom of derealisation in which the external world also appears unfamiliar (Simeon, 2009). Patients describe their experiences of unreality as if they are living in a dream, and their sense of detachment from the world as though they are viewing life from behind a glass (Hunter et al., 2003).

Systematic research in the field of dissociation has been limited by the absence of a reliable and valid setting for the experimental induction of dissociative states (Bremner et al., 1998). Experimental techniques that were used in previous studies of dissociation included the dot-staring task (Miller et al., 1994; Leonard et al., 1999; Holmes et al., 2006; Lickel et al., 2008). During these experiments, individuals stare at a black dot for between 3 and 10 min. These studies showed that the dot-staring task elicited dissociative experiences, including both depersonalization and derealisation symptoms.

A recently developed experimental tool that can induce dissociative states involves gazing at one's own face in a mirror under low illumination for at least 10 min (Caputo, 2010a, 2010b). Mirror-gazing at low illumination produces dissociative states of short-term memory for emotionally neutral stimuli (Brewin et al., 2013), and of visual memory (Brewin and Mersaditabari, 2013). Dissociative symptoms produced by mirror-gazing dissipated after 15 min (Brewin et al., 2013).

A new study showed that effects similar to mirror-gazing were obtained in dyads by gazing at another person's face instead of one's own (Caputo, 2013). However, in this previous study no standardized measures of dissociation were used. In the present article, a standard measure of dissociation is employed. The first hypothesis is that interpersonal gazing in dyads under low illumination produces dissociative symptoms, as previously found by mirror-gazing at self-face under low illumination (Brewin et al., 2013; Brewin and Mersaditabari, 2013).

Another finding of previous studies of mirror-gazing (Caputo, 2010a, 2010b) and interpersonal-gazing (Caputo, 2013) under low illumination was the perception of hallucination-like illusions. Strange-face apparitions are both hallucination-like and temporary phenomena, with a frequency of about 2 illusions per minute and their duration of about 4–7 s per illusion. In previous studies, strange-face illusions were classified into different types or

categories. Moreover, some types of strange-face illusions could occur only once during a 10-min session. Indeed, this is often the case for those strange-face illusions that are most compelling and archetypal. Therefore, a questionnaire for subjective rating of strange-face illusions was used in this research. The study focused on the frequency of different types or categories of strange-face illusions by measuring the number of participants who had perceived (at least once) a strange-face illusion that is described by each question type. The second hypothesis of this study is that a phenomenological measure of strange-face illusions can be correlated to dissociative symptoms measured with a standardized test of dissociation.

Furthermore, strange-face apparitions can be considered from a different point of view. In studies on body dysmorphic disorder, the effect of mirror-gazing on patients is investigated (Windheim et al., 2011). However, these studies used a high level of illumination. Instead, a low illumination is needed for the mirror-gazing to produce dissociative states (Caputo, 2010b; Brewin and Mersaditabari, 2013). Therefore, in the present article, a questionnaire of dysmorphic face perception is provided on the basis of questionnaires used in past research on body dysmorphic disorder (Veale and Riley, 2001). The third hypothesis of this study is that face dysmorphia levels can be correlated to standardized measures of dissociation and phenomenological measures of strange-face illusions.

2. Method

2.1. Participants

Forty volunteers participated in the research (10 men; 30 women; mean age 21.85 years, S.D. 1.27, range=20–26 years). They were naïve observers who had no previous experience in psychological experiments and in psychological tests. Participants declared no history of psychiatric diseases.

2.2. Design

A between-group design was used with control and dissociation groups. Participants were randomly assigned to these two groups, separately for men and women in order to assign the same proportion of genders in the two groups. The dissociation group was made up of 20 participants (15 women). The control group was made up of 20 participants (15 women). Both dissociation and control groups were further organized in 10 pairs for each group through random pairing. The dependent variable was CADSS, DYFS, and SFQ scores.

2.3. Material

A very large room was chosen for the experimental setting. Eight lamps (220 V, 40 W, type incandescent bulb) placed all around on the walls of the room produced a diffused and relatively uniform illumination. The lamps were covered by dark grey curtains placed all around the walls of the room. These dark curtains strongly reduced illumination within the room. Illumination of participant faces was approx. 0.8 lx, measured by a digital photometer with a wide-angle sensor (Pantec by Carlo Gavazzi, LM-20). This level of illumination allowed detailed perception of fine face traits but attenuated colour perception.

2.4. Measures

2.4.1. State dissociation (CADSS)
The 19 subjective items from Clinician Administered Dissociative States Scale (CADSS) (Bremner et al., 1998) were used to assess dissociation (see Table 2). The response to each item is rated on a 5-point scale, from 'not at all' (0) to 'extremely' (4). The total score of CADSS can range from 0 to 76.

2.4.2. Dysmorphic-face scale (DYFS)
Three items were aimed to evaluate dysmorphic face perception (see Table 3). These items were adapted to face stimuli from a questionnaire on body dysmorphic disorder (Veale and Riley, 2001). Responses were rated on a 5-point scale, from 'not at all' (0) to 'extremely' (4). The total score of DYFS can range from 0 to 12.

Table 1

Mean scores for dissociation (CADSS), dysmorphic face perception (DYFS), and strange-face apparitions (SFQ). Standard deviations in parentheses.

Variable	Dissociation group (n=20)	Control group (n=20)
CADSS	27.00 (9.07)	7.25 (5.84)
DYFS	5.80 (3.59)	0.30 (0.66)
SFQ	15.70 (6.92)	–

2.4.3. Strange-face questionnaire (SFQ)
We were also interested in developing a questionnaire that was intended to quantify types and frequency of strange-face illusions, which are hallucination-like phenomena. Categories were designed according to previous researches both with mirror-gazing (Caputo, 2010a, 2010b) and with interpersonal-staring (Caputo, 2013). The 15 items are shown in Table 4. The response to each item is either 'no' or 'yes'; if a 'yes' response is given, then it is rated on a 4-point scale, from 'rarely' (1) to 'extremely' (4). First, a total SFQ score is calculated by adding the scores for the 15 items, with 'no' items considered to have a score of 0. Secondly, the number of 'yes' responses (which is indicated by n ('yes') in Table 4) is the number of participants who endorsed 'yes' responses. Finally, for each SFQ item, mean rating was calculated by averaging 1–4 ratings, relatively to n ('yes').

2.5. Procedure

Participants both in dissociation and control groups were introduced in pairs to the setting by saying that they will try a "*meditative experience with eyes open*" lasting 10 min. Pairs from the two groups were tested in a counterbalanced random order.

In the experimental group, the pair of participants sat in two chairs positioned one in front of the other. A distance of about a metre separated the heads of the dyad. After a few minutes of light adaptation, they receive the following (*dissociation*) instructions: "*You should maintain a neutral facial expression. Your task is to look at the other participant; you should keep staring into the eyes of the other participant. The session will last 10 min.*"

In the control group, the pair of participants sat in two chairs that were placed side-by-side at about a metre apart, so that the two participants did *not* gaze at each other but toward the room wall. They were not required to stare at a fixed point. After a few minutes of light adaptation, they receive the following (*control*) instructions: "*You should maintain a neutral facial expression. Your task is to stay with eye open. The session will last 10 min.*"

Immediately after the end of the 10-min session, normal light illumination of the room was turned on and participants were given a sheet of paper that contained CADSS and DYFS items. They were invited to accurately fill out their questionnaire. Then, when participants handed in the first sheet compiled, they received the second page containing SFQ items to be filled out. At the end of the experiment, participants were fully debriefed. Individuals of both control and dissociation groups received these same tests. Control individuals could easily interpret DYFS items in reference to their own faces. SFQ items were given to the control group in order to exclude the effect of suggestion.

2.6. Statistical analyses

Descriptive statistics were calculated from the ratings of CADSS, DYFS and SFQ in order to calculate total scores. Correlations were calculated with Pearson coefficients and consistency with Cronbach alpha. One-way ANOVAs were carried out with CADSS and DYFS as dependent variables. Factorial analysis on ratings to SFQ items was the principal component analysis with quartimax rotation.

3. Results

Participants belonging to the dissociation group described that they had a compelling experience that they never had before. Instead, participants belonging to the control group reported no special or unusual experience.

The mean CADSS, DYFS, and SFQ total scores are shown in Table 1. In the dissociation group, the effect of gender (two-level factor: male vs. female) was not significant on CADSS total score ($F(1,18)=0.00$; $p > 0.95$), nor on DYFS total score ($F(1,18)=1.74$; $p > 0.20$), nor on SFQ total score ($F(1,18)=0.86$; $p > 0.36$). In the

Table 2
Mean endorsement of CADSS items in the dissociation group (standard deviations in parentheses). Correlations of items with DYFS and SFQ total scores.

Clinician Administered Dissociative States Scale (CADSS) items	Mean (S.D.)	Corr. DYFS	Corr. SFQ
10. Do colours seem to be diminished in intensity?	2.45 (0.89)	0.11	−0.26
16. Do sounds almost disappear or become much stronger than you would have expected?	2.30 (1.26)	0.11	−0.17
15. Do you space out, or in some other way lose track of what is going on?	2.15 (1.14)	0.37	−0.03
12. Does this experience seem to take much longer than you would have expected?	2.00 (1.26)	−0.02	0.24
8. Would people seem motionless, dead, or mechanical?	1.95 (1.00)	0.47*	0.25
18. Does it seem as if you are looking at the world through a fog, so that people or objects seem far away or unclear?	1.70 (1.13)	0.67**	−0.01
11. Do you see things as if you were in a tunnel, or looking through a wide angle photographic lens?	1.65 (1.04)	0.13	−0.03
6. Do you feel disconnected from your own body?	1.40 (1.19)	0.51*	0.08
14. Do things happen that you later cannot account for?	1.40 (1.31)	0.52*	0.35
2. Do things seem to be unreal to you, as if you are in a dream?	1.35 (1.31)	0.62**	0.08
5. Do you feel as if you are watching the situation as an observer or spectator?	1.30 (1.17)	0.33	0.24
9. Do objects look different than you would expect?	1.30 (1.08)	0.22	−0.11
17. Do things seem to be very real, as if there is a special sense of clarity?	1.10 (1.21)	0.05	0.47*
1. Do things seem to be moving in slow motion?	1.05 (1.05)	0.45*	0.16
3. Do you have some experience that separates you from what is happening; for instance, do you feel as if you are in a movie or a play, or as if you are a robot?	0.90 (1.02)	0.08	0.31
7. Does your sense of your own body feel changed: for instance, does your own body feel unusually large or unusually small?	0.85 (1.04)	0.22	0.10
19. Do colours seem much brighter than you would have expected?	0.75 (1.25)	−0.01	0.28
4. Do you feel as if you are looking at things from outside of your body?	0.70 (1.03)	0.28	0.11
13. Do things seem to be happening very quickly, as if there is a lifetime in a moment?	0.70 (1.08)	0.34	0.49*

* $p < 0.05$.
** $p < 0.01$.

Table 3
Mean endorsement of DYFS items in the dissociation group (standard deviations in parentheses). Correlations of items with CADSS and SFQ total scores.

Dysmorphic face scale (DYFS) items	Mean (SD)	Corr. CADSS	Corr. SFQ
20. Does the face, or some of its features, seem to be deformed?	2.30 (1.49)	0.63**	0.35
22. Does the face seem different than you would have expected?	1.85 (1.31)	0.52*	0.20
21. Do you feel uncomfortable with the way the face appears?	1.65 (1.39)	0.60**	0.17

* $p < 0.05$.
** $p < 0.01$.

Table 4
Number of participants in the dissociation group who endorsed SFQ items with a 'yes' response: n ('yes'). Percentage of n ('yes') in the dissociation group (n=20). Mean rating of SFQ items relative to n ('yes'); standard deviation in parentheses. Correlations of items with CADSS and DYFS total scores.

Strange-face questionnaire (SFQ) items	n ('yes')	% n ('yes')	Mean (S.D.)	Corr. CADSS	Corr. DYFS
3. Did you see a dark face?	19	95	2.95 (1.13)	−0.04	0.14
1. Did you see that some facial traits were deformed?	18	90	2.89 (1.02)	−0.12	0.77**
5. Did you see a face of a stranger or unknown person?	15	75	2.20 (1.08)	0.03	0.32
4. Did you see the face of a monster?	15	75	2.00 (0.76)	0.53*	0.18
9. Did you see the face of an adolescent?	10	50	2.70 (1.16)	0.23	−0.14
15. Did you see that the face of the other had something in common with your face?	10	50	2.20 (1.03)	0.06	0.12
2. Did you see a luminous face?	9	45	1.33 (0.71)	0.28	−0.14
13. Did you see the face of a person of a different race than yours?	7	35	2.71 (1.19)	−0.00	0.03
6. Did you see the face of a hero or heroine?	6	30	2.33 (1.03)	0.29	0.07
11. Did you see the face of a domestic or savage animal?	6	30	2.50 (0.71)	0.36	0.21
14. Did you see the face of a spiritual person?	6	30	1.67 (1.15)	0.04	0.02
10. Did you see the face of a sexually undefined person or an androgyne?	5	25	1.80 (0.84)	0.03	0.15
8. Did you see the face of an old person?	4	20	1.25 (0.50)	0.18	0.16
12. Did you see the face of one of your relatives?	3	15	1.67 (0.82)	0.40	−0.17
7. Did you see the face of a child?	2	10	2.50 (1.22)	−0.07	0.18

* $p < 0.05$.
** $p < 0.01$.

dissociation group, correlations between the age of participants and CADSS, DYSF, SFQ total scores were non-significant ($p > 0.50$).

Between-group ANOVAs with a two-level factor (dissociation vs. control group) were run. Participants in the dissociation group had statistically higher CADSS scores ($F(1,38)=66.95$; $p < 0.001$) and higher DYFS scores ($F(1,38)=45.36$; $p < 0.001$) than participants in the control group. Indeed, participants in the control group generally responded only to items 10, 12, and 15 of CADSS that correspond to perceptual experiences. Few participants in the control group endorsed item 21 of DYFS. All participants in the control group responded 'no' to all SFQ items.

In the dissociation group, correlations of CADSS, DYFS, and SFQ total scores showed a significant correlation between CADSS and DYFS ($r=0.68$; $p < 0.001$), a non-significant correlation between CADSS and SFQ ($r=0.33$; $p > 0.15$), and a non-significant correlation between DYFS and SFQ ($r=0.33$; $p > 0.15$).

In the dissociation group, DYFS items showed significant correlations between item 20 and 22 ($r=0.64$; $p < 0.002$), between item 21 and 22 ($r=0.75$; $p < 0.001$), and between item 20 and 21 ($r=0.43$; $p=0.05$). There was consistency across the three items of DYFS (alpha=0.82).

In the dissociation group, SFQ items showed various significant correlations. Therefore, a factorial analysis was done. Principal component analysis with quartimax rotation extracted three factors from the ratings to all SFQ items. These three factors explained 56.91% of the variance. The first factor comprised: own face (coefficient=0.91), dark face (-0.89), spiritual face (0.79), and adolescent face (0.77). The second factor comprised: animal face (0.84), monster face (0.84), deformed face (0.68), and stranger face (0.65). The third factor comprised: luminous face (0.87), different race face (0.65), androgyne face (0.64), and hero face (0.63). When the sign of dark face ratings was changed to negative (i.e. non-dark face), these extracted 12 items of SFQ showed a good level of consistency (alpha=0.75). The remaining three items (relatives, old person and child) seemed to be independent.

CADSS and DYFS items most commonly endorsed by participants in the dissociation group are shown in Tables 2 and 3, respectively. SFQ items most commonly endorsed with a 'yes' response by participants in the dissociation group are shown in Table 4. Rating of strange-face illusions (relative to n ('yes') participants in the dissociation group) are shown in Table 4.

In the dissociation group, correlations between items and total scores of CADSS, DYFS and SFQ are shown in the right columns of Tables 2–4. All three DYFS items were significantly correlated with CADSS total score (Table 3) and, conversely, various items of CADSS were significantly correlated with DYFS total score (Table 2). It should be noticed that no items of CADSS are concerned with face stimuli. Finally, SFQ items and SFQ total score showed few correlations with sparse items of CADSS and DYFS (Table 4).

4. Discussion

The results of the experiment show that interpersonal-gazing of dyads at low illumination produces dissociative symptoms. This finding supports previous results in a study (Caputo, 2013) that did not used standardized measures of dissociation. Experimentally induced dissociation was also demonstrated in previous studies that used mirror-gazing under low illumination (Brewin et al., 2013; Brewin and Mersaditabari, 2013). The comparison of CADSS scores indicates higher values of dissociation in the experiment of interpersonal-gazing (27.00 ± 9.07 vs. 16.37 ± 7.63 total score of CADSS) with respect to mirror-gazing (Brewin and Mersaditabari, 2013). This increase of dissociation could be explained by higher levels of mimicry and emotional contagion in interpersonal-gazing with respect to mirror-gazing at self-face (Caputo, 2013).

In the experiment reported in this study, it is possible that dissociation in the control group has been under-evaluated, since the control group was controlled only for low illumination. Instead, gazing at a fixed location in the room was left uncontrolled. In fact, previous studies found dissociation when observers were engaged in a task of dot-gazing (Miller et al., 1994; Leonard et al., 1999; Holmes et al., 2006; Lickel et al., 2008). Therefore, further research would be required to disentangle these different contributions made to dissociation in the control group. However, the comparison with a study of mirror-gazing under high illumination can show that control for low illumination produced higher dissociation (7.25 ± 5.84 vs. 2.7 ± 3.04 total score of CADSS) than control for staring (Brewin and Mersaditabari, 2013).

A second finding is that interpersonal-gazing in dyads produces dysmorphic face perceptions, as measured by items adapted to faces from scales of body-dysmorphic-disorder (Veale and Riley, 2001; Windheim et al., 2011). The scale of face dysmorphia and the scale of dissociative symptoms (which does not regard faces directly) were correlated. Hence, this result can indicate that, under low illumination, dissociation involves distorted perceptions of the face of another person and uncomfortable feelings for the other's face deformations.

The third finding is that dysmorphic face perceptions measured by DYFS are correlated to perceived deformations of the other's facial traits (item 1 of SFQ; Table 4). Since deformations of facial traits characterize only one type of strange-face apparition, DYFS items will therefore capture only one specific type of apparition.

The fourth finding indicates that members of the dyads perceived hallucinatory-like phenomena of strange-face apparitions. This result agrees with previous studies of strange-faces during mirror-gazing under low illumination (Caputo, 2010a, 2010b, 2014). In this article, a preliminary scale for strange-face illusions was proposed, which seems to have adequate psychometric validity.

However, total scores of strange-face apparitions (SFQ) were not correlated with total scores of dissociation (CADSS). This lack of correlation can suggest that dissociative symptoms and hallucination-like apparitions may reflect different processes. Interpersonal-gazing and mirror-gazing under low illumination can provoke both dissociative symptoms and hallucination-like perceptions, whereas these two effects may be partially independent. Moreover, item-by-item correlations showed a correlation between the total SFQ score, strong sense of "reality" (item 17 of CADSS; Table 2), and a special kind of awareness (item 13 of CADSS; Table 2). This can further suggest that strange-face illusions are somewhat in contrast to dissociation and presumably involve a temporary return to a high level of consciousness.

Thus, a possible explanation of the results can be (1) the sensory deprivation (low lighting) and the sustained gazing toward a stimulus (the other's face) induces a general level of dissociation; (2) the strange-face apparition momentarily interrupts the dissociative state by provoking a temporary hallucination. In other words, the strange-face apparition can be a form of rebound to "reality" that occurs from a general state of dissociation due to sensory deprivation. Dissociation is characterized by a disruption or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour (Spiegel et al., 2013). Therefore, the rebound to "reality" from dissociation can actually lead to a hallucination, since the binding of mental processes is compromised.

From another point of view, the measurement of strange-face apparitions can be relevant in order to investigate phenomenological meanings of experimentally-induced hallucinations. Indeed, most observers endorsed items of SFQ, confirming that strange-face apparitions had somewhat archetypal meanings. A possible explanation of strange-face illusions is based on facial mimicry and contagion (Dimberg et al., 2000; Sonnby-Borgstrom, 2002), which can operate within the subject, resonating with the other's face (Caputo, 2013). Strange-faces can be archetypal in character as a consequence of prototypical somatic/motor facial patterns of basic emotions (Caputo, 2014).

A further hypothesis is that strange-face illusions are the 'projection' of the subject's unconscious meanings into the other's body. Dissociation can facilitate this 'projection' according to the mechanism of hallucinations outlined above. In the results of the experiment, the involvement of a psychodynamic 'projection' can be envisaged by relatively high frequency of subjects perceiving their own facial features into the others' face in dyads (item 15 of SFQ; Table 4). More specific questions should be integrated to SFQ items to also confirm this hypothesis in the clinical population.

For different reasons, the results of the present study should be considered as preliminary to a more complete investigation. Firstly, in the control group, dissociation was almost surely

under-evaluated, since control participants were not required to stare at a point in space (Lickel et al., 2008). Secondly, in the experimental group, the number of participants was quite limited; hence, a larger sample of individuals should have displayed a correlation between dissociation and strange-face illusions. Thirdly, in the experimental group, dysmorphic perceptions were not directly compared to standard body dysmorphic disorder tests. Fourthly, the items that were included in the strange-face questionnaire should be incremented in order to describe a complete phenomenology of strange-face illusions. The questionnaire should be evaluated both on dyads and individuals staring at their own faces reflected in a mirror.

In conclusion, the relationship between dissociation and hallucinations might be a form of compensation or rebound. In addition, dissociated meanings within the self might be 'projected' into the other "real" person outside the self.

References

Bremner, J.D., Krystal, J.H., Putnam, F.W., Southwick, S.M., Marmar, C., Carney, D.S., Mazure, C.M., 1998. Measurement of dissociative states with the clinician-administered dissociative states scale (CADSS). Journal of Traumatic Stress 11, 125–136.

Brewin, C.R., Ma, B.Y.T., Colson, J., 2013. Effects of experimentally induced dissociation on attention and memory. Consciousness and Cognition 22, 315–323.

Brewin, C.R., Mersaditabari, N., 2013. Experimentally-induced dissociation impairs visual memory. Consciousness and Cognition 22, 1189–1194.

Caputo, G.B., 2010a. Strange-face-in-the-mirror illusion. Perception 39, 1007–1008.

Caputo, G.B., 2010b. Apparitional experiences of new faces and dissociation of self-identity during mirror-gazing. Perceptual and Motor Skills 110, 1125–1138.

Caputo, G.B., 2013. Strange-face illusions during inter-subjective gazing. Consciousness and Cognition 22, 324–329.

Caputo, G.B., 2014. Archetypal-imaging and mirror-gazing. Behavioral Sciences 4, 1–13.

Dimberg, U., Thunberg, M., Elmehed, K., 2000. Unconscious facial reactions to emotional facial expressions. Psychological Science 11, 86–89.

Holmes, E.A., Brown, R.J., Mansell, W., Fearon, R.P., Hunter, E.C., Frasquilho, F., Oakley, D.A., 2005. Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. Clinical Psychology Review 25, 1–23.

Holmes, E.A., Oakley, D.A., Stuart, A.D.P., Brewin, C.R., 2006. Investigating peritraumatic dissociation using hypnosis during a traumatic film. Journal of Trauma and Dissociation 7, 91–113.

Hunter, E.C.M., Phillips, M.L., Chalder, T., Sierra, M., David, A.S., 2003. Depersonalization disorder: a cognitive behavioural conceptualisation. Behaviour Research and Therapy 41, 1451–1467.

Leonard, K.N., Telch, M.J., Harrington, P.J., 1999. Dissociation in the laboratory: a comparison of strategies. Behaviour Research and Therapy 37, 49–61.

Lickel, J., Nelson, E., Lickel, A.H., Deacon, B., 2008. Interoceptive exposure exercises for evoking depersonalization and derealization: a pilot study. Journal of Cognitive Psychotherapy 22, 321–330.

Miller, P.P., Brown, T.A., DiNardo, P.A., Barlow, D.H., 1994. The experimental induction of depersonalization and derealization in panic disorder and non-anxious subjects. Behavior Research and Therapy 32, 511–519.

Simeon, D, 2009. Neurobiology of depersonalization disorder. In: Dell, P.F., O'Neil, J. A. (Eds.), Dissociation and the Dissociative Disorders: DSM-V and Beyond. Routledge, New York, pp. 367–372.

Sonnby-Borgstrom, M., 2002. Automatic mimicry reactions as related to differences in emotional empathy. Scandinavian Journal of Psychology 43, 433–443.

Spiegel, D., Lewis-Fernandez, R., Lanius, R., Vermetten, E., Simeon, D., Friedman, M., 2013. Dissociative disorders in DSM-5. Annual Review of Clinical Psychology 9, 299–326.

Veale, D., Riley, S., 2001. Mirror, mirror on the wall, who is the ugliest of them all? The psychopathology of mirror gazing in body dysmorphic disorder. Behaviour Research and Therapy 39, 1381–1393.

Windheim, K., Veale, D., Anson, M., 2011. Mirror gazing in body dysmorphic disorder and healthy controls: effects of duration of gazing. Behaviour Research and Therapy 49, 555–564.