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On the factor structure of the Dissociative Experiences Scale: contribution with an Italian version of the DES-II

Struktura czynnikowa Skali Przeżyć Dysocjacyjnych: włoska wersja skali DES-II

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Abstract

Aim of the study: Notwithstanding its clinical and empirical relevance, there is no consensus on how to conceptualize dissociation. This may be partly due to the conflicting results yielded on the factor structure of the gold-standard self-report measure of dissociation (the Dissociative Experiences Scale-Revised; DES-II, Carlson and Putnam, 1993). In an attempt to advance research on this topic, we sought to explore the factorial structure of an Italian version of the DES-II. **Material and methods:** A sample of 320 subjects (122 inmates and 198 community participants) was administered the Italian version of the DES-II. **Results:** The Italian version of the DES-II showed good psychometric properties and replicated a two-factor structure. Items content seemed to support the distinction into two qualitatively different forms of dissociative experiences, described as detachment and compartmentalization phenomena. In line with the expectations, participants in the inmate sample reported higher rates of dissociative experiences than community participants, on both dimensions. **Conclusions:** This study provides further support for the validity of the Italian version of the DES-II for use with community and inmate samples. Furthermore, we corroborated previous evidence on a two-factor structure of the DES-II, which is consistent with theoretical assumptions describing two distinct, albeit overlapping, dissociative dimensions (i.e., detachment and compartmentalization).

Key words: dissociation, community sample, inmates, detachment, compartmentalization

Streszczenie

Cel badania: Niezależnie od wartości klinicznej i empirycznej pojęcia, jakim jest dysocjacja, nie ma zgody co do właściwego sposobu jego konceptualizacji. Częściowo może to być spowodowane sprzecznymi wynikami analizy struktury czynnikowej złotego standardu wśród narzędzi do samooceny zjawisk dysocjacyjnych, jakim jest Skala Przeżyć Dysocjacyjnych (*Dissociative Experiences Scale-Revised*; DES-II, Carlson i Putnam, 1993). Mając na celu pogłębienie badań na ten temat, autorzy podjęli się analizy struktury czynnikowej włoskiej wersji skali DES-II. **Materiał i metody:** Badanie obejmowało próbę 320 osób (122 więźniów i 198 osób należących do populacji ogólnej). Zastosowano w nim włoską wersję skali DES-II. **Wyniki:** Włoska wersja skali DES-II wykazała dobre właściwości psychometryczne i została w niej zreplikowana struktura dwuczynnikowa. Treść pozycji na skali wydawała się potwierdzać istnienie podziału na dwie jakościowo inne formy przeżyć dysocjacyjnych, ujmowane jako oddzielenie (ang. *detachment*) i szufladkowanie (ang. *compartmentalization*). Zgodnie z oczekiwaniami więźniowie częściej zgłaszali występowanie przeżyć dysocjacyjnych niż osoby należące do populacji ogólnej, na obu wymiarach. **Wnioski:** Niniejsze badanie dostarcza kolejnych dowodów na zasadność stosowania włoskiej wersji skali DES-II w badaniach na populacji ogólnej oraz więziennej. Potwierdzono również poprzednie dane świadczące o dwuczynnikowej strukturze skali DES-II, co jest zgodne z założeniami teoretycznymi opisującymi dwa odrębne, choć nakładające się na siebie wymiary dysocjacji (tj. oddzielenie i szufladkowanie).

Słowa kluczowe: dysocjacja, populacja ogólna, więźniowie, oddzielenie, szufladkowanie

INTRODUCTION

Dissociation encompasses those processes involving a "lack of normal integration of thoughts, feelings, and experiences into the flow of consciousness and memory" (p. 727; Bernstein and Putnam, 1986). Although they may occasionally occur in the daily life of healthy people, pathological levels of dissociative experiences have been reported as characteristic or co-occurring across diverse psychiatric conditions (Dell and O'Neil, 2009; Sar *et al.*, 2007; Schäfer *et al.*, 2010), with the strongest association usually reported between dissociation and vulnerability to psychotic symptoms (Barker-Collo, 2001; Simões *et al.*, 2014). Recent evidence also supported the presence of dissociation in individuals who display violent behaviour (Moskowitz, 2004; Ruiz *et al.*, 2008).

Notwithstanding the clinical relevance of dissociation (Holmes *et al.*, 2005; Liotti, 2006), there is a need for a clearer conceptualization of the dissociation construct (Dell and O'Neil, 2009). According to the DSM-5 (American Psychiatric Association, 2013), dissociative disorders (DD) are defined into three broad categories, namely: dissociative identity disorder, dissociative amnesia, and depersonalization/derealization disorder. In the DES literature, dissociation has historically been described with a three-factor model, respectively encompassing absorption, depersonalization/derealization, and amnesia experiences (e.g., Carlson and Putnam, 1993). Notably, in this framework identity alteration would not be distinguished from other experiences. Another conceptualization which is worth mentioning has been derived from clinical description of dissociation (Allen, 2001; Cardeña, 1994) that subsequently yielded convergent empirical findings (Brown, 2002; Holmes *et al.*, 2005). According to this model (Allen, 2001), two distinct qualitative forms of dissociation were described, namely: detachment and compartmentalization. Detachment has been depicted as the most pervasive form of dissociative disturbance, which encompasses depersonalization, derealization, and similar phenomena such as out-of-body experiences. On the other hand, compartmentalization incorporated the more dramatic and perplexing of dissociative phenomena: amnesia, fugues, and episodes of dissociative identity disorder (Allen, 2001; Holmes *et al.*, 2005). Finally, another way to conceptualize dissociation is to distinguish between pathological and non-pathological dissociative experiences (e.g., Waller *et al.*, 1996; Watson, 2003). As a result, some authors recently argued that to date there is no agreement on how to conceptualize dissociation (Dell and O'Neil, 2009). Notably, factor analytic studies with mainstream measures of dissociation could help in reaching a clearer picture.

If the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D; Steinberg, 1993) is regarded as the best diagnostic assessment tool for DD, the Dissociative Experience Scale (DES; Bernstein and Putnam, 1986) is considered the gold-standard instrument to quantify the frequency of self-reported dissociative experiences (van IJzendoorn and Schuengel, 1996). It has been translated into more than 20 languages and it has mostly been used in its revised version (DES-II; Carlson and Putnam, 1993). The DES can be used as a screening instrument for DD and for determining the contribution of dissociation to other psychiatric syndromes as well as with nonclinical samples (Carlson and Putnam, 1993; Espírito Santo and Abreu, 2009; van IJzendoorn and Schuengel, 1996).

Unfortunately, studies exploring the factor structure of the DES-II have to date been unsupportive in deciding among different conceptual models, yielding conflicting results. The original three-factor model proposed by Carlson and Putnam (1993) was confirmed across several studies (Carlson *et al.*, 1993; Fabbri Bombi *et al.*, 1996; Ross *et al.*, 1991; Ruiz *et al.*, 2008; Stockdale *et al.*, 2002). Nevertheless, other authors found different factorial patterns for the DES, ranging from one- (Bernstein *et al.*, 2001; Lipsanen *et al.*, 2003; Mazzotti and Cirrincione, 2001) to seven-factor models (Ray *et al.*, 1992). Moreover, Amdur and Liberzon's (1996), and Espírito Santo and Abreu's (2009) findings supported a factorial structure composed by four factors.

Also, a two-factor structure first emerged in the study by Waller *et al.* (1996), who adopted a typological model of dissociation. However, Waller *et al.* (1996) referred to these factors as respectively resembling pathological (Factor 1) and non-pathological (Factor 2) dissociation. Notably, a categorical distinction between pathological and non-pathological dissociation has failed to prove its utility (Leavitt, 1999) and the dimensional conceptualization of dissociation as a continuum ranging from normal to pathological forms is preferred both in clinical and research settings (Bernstein and Putnam, 1986; Bernstein *et al.*, 2001; Carlson *et al.*, 1993; Holmes *et al.*, 2005; Ruiz *et al.*, 2008). Recently, a French version of the DES (Larøi *et al.*, 2013) replicated the two-factor structure, although proposing a different interpretation. Indeed, Larøi *et al.* (2013) described two forms of dissociative experiences. The first one included both dissociative amnesia episodes and depersonalization/derealization experiences and was described as resembling dissociation episodes, which may act as a defensive mechanism. The second factor was depicted as encompassing dissociative episodes associated with different forms of "cognitive failures," often concerning memory or attention. They referred to this type as automatic pilot-related dissociation episodes. Notwithstanding the possible clinical relevance of such an explanation, to the best of our knowledge this interpretation of the two factors does not seem consistent with any other empirical evidence (Brown, 2002), nor with mainstream clinical theories (Dell and O'Neil, 2009; Holmes *et al.*, 2005). Such inconsistency in the factor structure of the DES fosters at least one risk, which is the use of the original subscales reported by Carlson and Putnam (1993) without testing the factorial structure and the item loadings of the DES with the target

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sample, which in turn can lead to wrong-headed theoretical inferences on the dissociation construct.

In the present study, we sought to explore the factorial structure of an Italian version of the DES-II, using a combined sample of inmates and community-dwelling participants. It is noteworthy that to date there have been no studies that have investigated the psychometric properties and the factorial structure of the DES in Italian samples, let alone used it with Italian offender samples, even though the Italian translation has been available and widely used for almost 20 years (Barbasio and Granieri, 2013; Conti, 2000; Fabbri Bombi *et al.*, 1996).

MATERIAL AND METHODS

Participants

The sample was composed of 320 subjects: 122 inmates and 198 community participants. Inmates had an average age of 39.97 years (SD = 11.76) and community participants had an average age of 32.51 years (SD = 10.30); 98% of inmates and 58.6% of individuals from the community were males. All participants were Caucasian, and all inmates were convicted of violent offenses (i.e., armed robbery, assault, sexual offenses or abuse, murder or attempted murder). Exclusion criteria for both groups were the presence of cognitive disability or a diagnosed psychiatric disorder.

Procedures

Participants in the community sample were enrolled using the snowball sampling technique. The inmate sample was recruited from different jails and prisons located in or around Rome, as part of a larger study on inmates' psychopathology. Participants completed the measures anonymously, individually or in small-group sessions settled in the prison library in the presence of a licensed psychologist. Participants from both groups provided written informed consent to voluntarily take part in the study. The Italian Ministry of Justice and the Sapienza University of Rome Research Ethics Board approved the whole procedure, which conformed to the principles included in the Declaration of Helsinki.

Measure

The Dissociative Experiences Scale-II (DES-II; Carlson and Putnam, 1993) consists of 28 statements describing various dissociative experiences, some common (e.g., missing part of a conversation) and others much more unusual (e.g., standing in front of a mirror without recognizing). Participants had to rate the percentage of occurrence of dissociative experiences using a scale from 0% to 100% (by 10s, resulting in an 11-point scale ranging from 0 to 100, with 0% meaning *never* and 100% meaning *at least once per week*). The DES-II total score is then computed averaging the score on each of the 28 items. Participants were instructed to rate the extent to which they experienced dissociative symptoms, if any, without being under the effects of alcohol or drugs. The DES-II showed high reliability in its original version (test-retest = $.79 < r < .84$; split-half = $.83 < r < .93$; Cronbach's $\alpha = .95$; Carlson and Putnam, 1993) as well as in its Italian translation (Cronbach's $\alpha = .91$; split-half: $r = .92$; Fabbri Bombi *et al.*, 1996). In the present study, we used the Italian translation reported by Conti (2000), which in our study showed an excellent internal consistency (Cronbach's $\alpha = .96$).

Statistical analyses

We chose natural logarithmic transformations as the best technique to reduce the skewness in our raw data (Roberts, 2008). A first way to determine the number of factors to retain was a parallel analysis (Watkins, 2000) using a Monte Carlo PCA, because it is a way of calculating the average eigenvalues for 100 sets of random data of the same size as our data (28 variables × 320 participants). After doing that, each eigenvalue obtained in SPSS was compared with the corresponding value from the random results generated by parallel analysis. Then, we performed an exploratory factor analysis with Maximum Likelihood (ML) estimator, because it allows the estimation of indices of model fit and permits the computation of model parameter standard errors, confidence intervals, and significance tests. The Root Means Squared Error of Approximation (RMSEA) is particularly indicated for testing model fit. According to Browne and Cudeck (1993), a good model should have a RMSEA value lower than .08, while Hu and Bentler (1999) said that it should be lower than .06. MacCallum *et al.* (1996) defined the following criteria: a model has a close fit if RMSEA < .05; a fair fit if .05 < RMSEA < .08; a mediocre fit if .08 < RMSEA < .10; a poor fit if RMSEA > .10. The appropriate number of factors is determined by examining the RMSEA values for the sequence of models. The sequence starts with a monofactorial model and a new factor is added step by step until a model with an RMSEA lower than .05 (ideally) is reached (Fabrigar and Wegener, 2012). The RMSEA difference (ΔRMSEA) between two models is also important. According to Fabrigar and Wegener (2012), any difference of .02 or greater can be considered a substantial difference in fit; differences between .01 and .019 can be considered marginal differences; differences less than .01 can be considered not meaningful. Therefore, if adding a new factor, ΔRMSEA is lower than .01 (in absolute values), then the new factor can be considered not meaningful and the previous model determines the appropriate number of factors. After calculating descriptive statistics for both samples, we tested for significant differences between inmates and controls, by carrying out multiple t-tests for independent samples.

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# factors	χ^2	*df*	*p*	RMSEA	90% RMSEA	ΔRMSEA
1	873.51	350	<.001	.0705	.0627–.0741	
2	597.35	323	<.001	.0537	.0450–.0579	–.0168
3	476.72	297	<.001	.0458	.0361–.0506	**–.0079**

Tab. 1. Goodness of fit indexes of factorial models tested in exploratory factor analysis with ML estimation. ΔRMSEA lower than the critical value of .01 is in boldface

RESULTS

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .96 (should be ≥ .60) and Bartlett's test of sphericity value was significant ($\chi^2 = 4398.643$, $df = 378$, $p < .001$), indicating that the data was adequate for factor analysis. According to the screeplot, an evident leveling off in correspondence of the third factor emerged. Screeplots are criticized because it is often difficult to see a clear drop in the curve. The first four eigenvalues were: 11.13; 1.15; .61; .49. Even if in our case the drop is clearly evident, there was a strong difference between the first and the second eigenvalue. Yet the second eigenvalue is smaller than the criterion value from parallel analysis, which showed only one component exceeding the corresponding criterion values for a randomly generated data matrix of the same size (eigenvalue #2 = 1.50; *SD* = .04). Therefore, we carried out an analysis for testing differences in RMSEA (ΔRMSEA) between models with different number of factors. We limited our analyses to a model composed by one, two, or three factors. Tab. 1 shows the goodness of fit indexes (χ^2, RMSEA, 90% C.I. of RMSEA and ΔRMSEA) of factorial models.

DES-II items	Factor 1	Factor 2	h^2
1. Driving a car and realizing one doesn't remember part of the trip	**.428**	.025	.199
2. Missing part of a conversation	**.557**	–.099	.241
3. Finding oneself in a place but unaware of how one got there	**.332**	**.455**	.531
4. Finding oneself dressed in clothes one doesn't remember putting on	–.007	**.752**	.558
5. Finding unfamiliar things among one's belongings	**.352**	**.417**	.507
6. Being called with a different name by people one doesn't know	**.447**	.250	.421
7. Seeing oneself as if looking at another person	.176	**.626**	.580
8. Not recognizing friends or family members	–.164	**.828**	.520
9. Not remembering important events in one's life	**.366**	.294	.373
10. Being accused of lying when one is telling the truth	**.511**	.137	.380
11. Not recognizing one's reflection in a mirror	.049	**.709**	.554
12. Other people and objects do not seem real	.155	**.549**	.447
13. Feeling as though one's body is not one's own	.039	**.694**	.522
14. Remembering past so vividly one seems to be reliving it	**.715**	–.075	.440
15. Not sure if remembered event happened or was a dream	**.584**	.079	.413
16. Being in a familiar place but finding it unfamiliar	**.505**	.214	.454
17. Absorption in television program or movie	**.532**	.061	.333
18. So involved in fantasy that it seems real	**.492**	.204	.426
19. Able to ignore pain	**.384**	**.317**	.420
20. Staring into space	**.712**	.027	.535
21. Talking out loud to oneself when alone	**.392**	.103	.222
22. Feeling as though one were two different people	**.471**	.255	.457
23.Usually difficult things can be done with ease and spontaneity	**.700**	–.095	.404
24. Not sure whether one has done something or only thought about it	**.743**	–.120	.440
25. Finding evidence of having done things one can't remember doing	**.641**	.072	.481
26. Finding notes or drawings that one must have done but doesn't remember doing	**.488**	.150	.365
27. Hearing voices inside one's head	.038	**.722**	.562
28. Looking at the world through a fog	.079	**.641**	.488
% explained var.	23.73	20.10	
Cronbach's *a*	.936	.934	

Note. DES-II: Dissociative Experiences Scale-II; h^2: communalities.
Loadings greater than .30 (in absolute value) are bolded.

Tab. 2. Items content and factor loadings of the DES-II obtained with oblimin rotation (ML estimation), corresponding percentages of variance explained by each factor and internal consistency coefficients (Cronbach's α) for items grouped in each factor

DES-II items	Factor 1	Factor 2
1. Driving a car and realizing one doesn't remember part of the trip	.446	.329
2. Missing part of a conversation	.486	.297
3. Finding oneself in a place but unaware of how one got there	.655	.691
4. Finding oneself dressed in clothes one doesn't remember putting on	.528	.747
5. Finding unfamiliar things among one's belongings	.649	.668
6. Being called with a different name by people one doesn't know	.625	.568
7. Seeing oneself as if looking at another person	.621	.751
8. Not recognizing friends or family members	.425	.711
9. Not remembering important events in one's life	.575	.554
10. Being accused of lying when one is telling the truth	.609	.501
11. Not recognizing one's reflection in a mirror	.553	.744
12. Other people and objects do not seem real	.546	.660
13. Feeling as though one's body is not one's own	.533	.722
14. Remembering past so vividly one seems to be reliving it	.661	.433
15. Not sure if remembered event happened or was a dream	.640	.494
16. Being in a familiar place but finding it unfamiliar	.657	.573
17. Absorption in television program or movie	.575	.439
18. So involved in fantasy that it seems real	.637	.554
19. Able to ignore pain	.609	.590
20. Staring into space	.731	.534
21. Talking out loud to oneself when alone	.465	.382
22. Feeling as though one were two different people	.652	.590
23. Usually difficult things can be done with ease and spontaneity	.632	.403
24. Not sure whether one has done something or only thought about it	.658	.409
25. Finding evidence of having done things one can't remember doing	.692	.528
26. Finding notes or drawings that one must have done but doesn't remember doing	.595	.497
27. Hearing voices inside one's head	.552	.749
28. Looking at the world through a fog	.534	.696
Note. DES-II: Dissociative Experiences Scale-II.		

Tab. 3. Structure matrix of DES-II obtained with oblimin rotation (ML estimation)

The analysis showed that ΔRMSEA was under the critical value of .01 (Fabrigar and Wegener, 2012) between the model with two and three factors. Therefore, the addition of a third factor is not meaningful and we can conclude that DES measures two latent factors.

On the basis of item content, items which were grouped in Factor 1 seemed to incorporate both amnesia and absorption experiences. Hence, this factor seemed to resemble compartmentalization, according to Allen's (2001) model and Holmes *et al.*'s (2005) model, whereas items grouped into Factor 2 encompassed depersonalization and derealization (i.e., detachment). Tab. 2 shows the factor loadings of each item after oblimin rotation.

Items 3, 5, and 19 loaded on both factors. However, according to their content and in order to preserve the theoretical coherence of the factors' composition, items 3 and 5 seemed more consistent with Factor 2, whereas item 19 with Factor 1. Correlation between factors was high (r = .776). Tab. 3 shows the structure matrix of the factor analysis.

Tab. 4 shows the descriptive statistics (means and standard deviations) for both inmates and community participants and the multiple *t*-tests for the DES-II total score and subscale scores.

Significant differences emerged in all three scores. Interestingly, within both samples, compartmentalization experiences (Factor 1) yielded a relatively higher score than detachment experiences (Factor 2).

DISCUSSION

As a whole, our results provide further support for the use of the Italian version of the DES-II as the gold-standard self-report measure to assess dissociation in nonclinical

	Inmates (n = 122)		Community (n = 198)			
Variables	**Mean**	***SD***	**Mean**	***SD***	***t***	***p***
DES-II (F1)	22.01	16.12	14.71	14.41	4.094	<.001
DES-II (F2)	11.03	16.33	5.59	12.16	3.177	<.01
DES-II	18.08	15.61	11.45	13.10	3.917	<.001
Note. DES-II (F1): Dissociative Experiences Scale-II Compartmentalization score; DES-II (F2): Dissociative Experiences Scale-II Detachment score; DES-II: Dissociative Experiences Scale-II total score.						

*Tab. 4. Means, standard deviations (*SD*) and multiple* t*-test comparisons for the DES-II total score and subscales between Italian inmates and community participants*

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individuals, extending its reliability and validity to the use with incarcerated offenders. Regarding the factorial structure of the DES-II, our contribution joins the complicated picture reported in the literature. Although we replicated a two-factor structure, our item loadings differed from those reported by Waller *et al.* (1996)*, with both a clinical (DD) and a nonclinical sample, and Larøi *et al.* (2013) in a community sample. Interestingly, the factor structures reported in these two studies were also different from each other. Furthermore, both Waller *et al.* (1996) and Larøi *et al.* (2013) incorporated in a common factor items referring to depersonalization and amnesia, and interpreted the two factors as representing different degrees of severity. This approach is inconsistent with clinical essays (Allen, 2001; Cardeña, 1994) which have historically considered depersonalization and amnesia as separate forms of dissociation. Moreover, to our knowledge, all previous factor analyses showed that they were always reported in separate factors (e.g., Holmes *et al.*, 2005), and that items representing different degrees of severity were equally distributed across factors (e.g., Carlson and Putnam, 1993). In the current Italian version of the DES-II, all the items reported by Carlson and Putnam (1993) as describing depersonalization or derealization loaded on Factor 2. Similarly, all the items referring to amnesia and absorption forms of dissociative experiences loaded on a separate factor, being grouped in Factor 1**. Notably, even though the primary use of a measure such as the DES is to screen individuals with clinically relevant or empirically significant levels of dissociation, rather than attempting to characterize the nature of dissociation, our factorial structure seems partly consistent with a qualitative distinction between two types of dissociative experiences, being compartmentalization (here, Factor 1), and detachment (here, Factor 2).

On the one hand, states involving a compartmentalization involve both amnesia and other phenomena broadly defined as somatoform dissociation, which are not included within the DES-II items (Brown, 2002; Cardeña, 1994; Holmes *et al.*, 2005; Nijenhuis *et al.*, 1996). According to this framework, the distinctive feature of compartmentalization is represented by an inability to intentionally control processes or actions that people are normally able to deliberately control (Brown, 2002).

On the other hand, following Holmes *et al.*'s suggestions (2005), we propose that subjective experiences of an altered state of consciousness, accompanied by a sense of separation from some aspects of everyday experience are characteristic of the detachment type of dissociation. Consistent with a dimensional conceptualization of dissociation, it has been argued that states of detachment lie on a continuum ranging from temporary experiences in the everyday life of healthy individuals, to persistent and/or acute conditions associated with a psychiatric disorder (Holmes *et al.*, 2005). In between these two extremes, there would certainly be other forms of detachment states with associated degrees of severity and levels of functional impairment (Holmes *et al.*, 2005).

The principal distinction between compartmentalization and detachment states is thought to be the preservation of apparently disrupted functions, which occurs in the context of compartmentalization phenomena (Holmes *et al.*, 2005). Indeed, even if the affected functions (e.g., the ability to bring usually accessible information into conscious awareness in the case of dissociative amnesia) are no longer amenable to intentional control, these compartmentalized processes keep operating normally, being in turn able to influence feelings, thoughts, and actions (Brown, 2002; Cardeña, 1994). In other words, even though they are reversible in principle (Cardeña, 1994) they work separately so that this compartmentalization cannot be reversed by a simple act of will (Holmes *et al.*, 2005). Notably, such distinction has been corroborated by neurobiological evidence showing different dissociative experiences belonging to each component share common underlying mechanisms in the brain (Brown, 2002; Simeon *et al.*, 2003). Moreover, the existence of a distinction between the two components seems to be useful in clinical settings, since these two forms of dissociation are relevant in the context of different psychopathological syndromes (Allen, 2001). However, less attention has been paid to the role of phenomena of absorption, defined as the experience of disconnecting oneself from the surroundings and getting involved in one's thoughts or other imaginative processes (Waller *et al.*, 1996), which loaded on the same factor as dissociative amnesia in the present study. According to our results, we suggest that states of absorption resemble more a mild form of compartmentalization than one of detachment, somehow involving a loss of volitional control (e.g., people "finding that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said" could be thought of as an inability to maintain attentional control, or simply distractibility). Moreover, another item regards people "having the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event," partially resembling a sensorial alteration which is typical of somatoform dissociation (Nijenhuis *et al.*, 1996), whose kind of experiences are not explicitly reported

* It is worth noting that Waller *et al.* (1996) used a taxometric approach in an effort to develop a short measure for the screening of pathological *vs.* non-pathological dissociation, rather than conducting a factor analytic study per se.

** It should be acknowledged that there are two exceptions. In fact, item 4 and item 8 loaded on our Factor 2 (i.e., depersonalization), whereas they are usually considered as part of the amnesia domain (Carlson and Putnam, 1993; Ross *et al.*, 1991). However, item 4 had already been reported as part of the depersonalization construct (Carlson *et al.*, 1993), suggesting that its loading may depend on the interpretation people give to its content (i.e., people "having the experience of finding themselves dressed in clothes that they don't remember putting on," which may also derive from a depersonalization episode while getting dressed). Similarly, we propose that item 8 (i.e., people "being told that they sometimes do not recognize friends or family members") may be interpreted as a derealization experience (e.g., "those do not seem my real friends, or relatives") rather than an actual amnesic fragmentation, especially in nonclinical individuals.

in the DES-II, yet are thought to be part of the compartmentalization type of dissociation (Holmes *et al.*, 2005). Supporting our view of absorption being a mild form of compartmentalization, Bernstein *et al.* (2001) noticed that absorption items were the more endorsed ones in nonclinical subjects, compared to those regarding both depersonalization and amnesia, and other authors agreed in considering absorption less pathological than both amnesia and depersonalization (Waller *et al.*, 1996). However, future studies are needed given that Allen (2001) included absorption at the low end of the continuum in the detachment domain. It should also be noted that previous works (e.g. Allen *et al.*, 1999) described a second possible form of dissociative amnesia which was different from the one associated with compartmentalization, being an encoding problem triggered by extreme detachment.

To further corroborate the proposed distinction between detachment and compartmentalization phenomena, some authors have reported findings attesting that people can experience detachment states unrelated to and without also experiencing compartmentalization episodes (Baker *et al.*, 2003; Simeon *et al.*, 2003), and also the opposite pattern has been reported (Brown *et al.*, 2005; Holmes *et al.*, 2005). Accordingly, in both samples considered here, a relatively higher degree of compartmentalization (as opposed to detachment) experiences emerged. However, the proportion of variance shared by the two factors was approximately 60%.

Notwithstanding the potentially relevant clinical impact of a qualitative distinction between detachment and compartmentalization type of dissociation, further convergent evidence is needed to support a bi-dimensional conceptualization of dissociation, the latter being the assumption that detachment and compartmentalization states are on two separate continuums (Allen, 2001; Holmes *et al.*, 2005). For instance, further studies are warranted in an attempt to replicate the two-factor solution of the DES-II reported here, both with other Italian independent samples and in other countries, as well as in clinical populations. To date, the inconsistency in its factor structure across studies and samples, as well as the high degree of shared variance among the factors, lead us to support the use of the DES-II as measuring a uni-dimensional construct (Bernstein *et al.*, 2001; Holmes *et al.*, 2005; Ruiz *et al.*, 2008; van IJzendoorn and Schuengel, 1996). This is especially true for research purposes (i.e., allowing a comparison of results from a different sample and corresponding factor structure), whereas in clinical practice it could be useful to disentangle different dimensions of dissociative experience, yet taking into account the overall degree of severity. As a whole, our samples' scores were in line with normative data reported in the literature worldwide with regard to the presence and severity of dissociation in both community (Carlson and Putnam, 1993; Carlson *et al.*, 1993; Espírito Santo and Abreu, 2009; Spitzer *et al.*, 2006; Stockdale *et al.*, 2002) and inmate samples (Becker-Blease and Freyd, 2007; Espirito-Santo and Costa, 2013; van IJzendoorn and Schuengel, 1996; Moskowitz *et al.*, 2005; Ruiz *et al.*, 2008; Snow *et al.*, 1996). As expected, inmates reported higher rates of dissociative experiences when compared with community-dwelling individuals. This finding suggests that dissociation may characterize the mental functioning of incarcerated individuals. Indeed, their rates of dissociative symptoms seemed comparable with those of patients with psychiatric disorders (e.g., van IJzendoorn and Schuengel, 1996). Thus, mental health services in prison should include an evaluation of dissociative symptoms in their standard assessment for newly incarcerated individuals as well as during the period of incarceration.

Our findings should be considered in light of their limitations, which also represent directions for future research. First, we did not assess the presence of psychotic symptoms in our inmate sample (although we excluded those diagnosed with psychiatric disorders, we cannot rule out the possible presence of transient psychotic episodes), and this could have influenced the higher degree of dissociative experiences that we found in the inmate sample. However, the presence of inmates with psychotic symptoms is likely to be constant across other inmate populations (Ruiz *et al.*, 2008). Then, we only used self-report measure, whereas a multi-method assessment (e.g., an expert-rated measure for assessing psychiatric symptoms, or an interview to investigate dissociative experiences) could limit the measurement bias that may affect questionnaires, even though both measures we used are widely accepted as valid and reliable instruments. Finally, we did not include a sample of psychiatric patients, nor a sample of patients with DD, thus our findings should not be generalized to those populations prior further explorations.

CONCLUSIONS

With these cautions in mind, this study provides further evidence to the reliability and validity of the DES-II as a measure to assess dissociation in nonclinical and inmate populations, representing the first Italian validation of the scale. Our results also highlight the alarming prevalence of dissociation in prisoners, calling for the inclusion of a proper psychiatric assessment in prison, which should include an evaluation of dissociative symptoms. Finally, the two-factor structure of the Italian version of the DES-II emerged in the present study, representing the first empirical support deriving from self-report assessment of dissociation to the dichotomy between detachment and compartmentalization types of dissociation (Allen, 2001; Holmes *et al.*, 2005). Nevertheless, further replications are necessary, possibly with clinical samples and with patients suffering from DD.

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Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations which might negatively affect the content of this publication and/or claim authorship rights to this publication.

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