



Non-suicidal self-injury (functions) in eating disorders: Associations with reactive and regulative temperament



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ABSTRACT

We investigated the association between NSSI (functions) and reactive and regulative temperament. Fifty-one female eating disorder (ED) outpatients completed the Self-Injury Questionnaire-Treatment Related and the Adult Temperament Questionnaire to assess NSSI (functions) and temperament. Overall, more than one third of all ED patients engaged in at least one type of NSSI, irrespective of ED subtype. ED patients with high levels of Negative Affectivity (reactivity) and low levels of Effortful Control (regulation) had the highest probability to engage in NSSI. Finally, different NSSI functions of the four factor model of [Nock and Prinstein \(2004\)](#) showed differential relationships with the reactive and regulative temperament dimensions. Clinical implications of these findings for the treatment of NSSI in ED patients will be discussed.

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1. Introduction

Non-suicidal self-injury (NSSI) is any socially unaccepted behaviour involving deliberate and direct injury to one's own body surface without suicidal intent, such as scratching, cutting and burning oneself ([Claes & Vandereycken, 2007a](#); [Nock, 2009](#)). Anorexia nervosa (AN) and bulimia nervosa (BN) are the most common specific forms of eating disorders: AN is characterized by food restriction and irrational fear of gaining weight, and BN is a disorder characterized by binge eating and purging (DSM-IV-TR; [APA, 2000](#)). The eating disorder not otherwise specified (EDNOS) is an eating disorder that does not meet the DSM-IV criteria for anorexia or bulimia nervosa.

The reported occurrence of NSSI in eating disorder (ED) patients ranges between 25.4% and 55.2% ([Muehlenkamp, Claes, Peat, Smits, & Vandereycken, 2011](#); [Svirko & Hawton, 2007](#)). Several studies show that NSSI is more prevalent in binge eating/purging ED patients (such as AN-BP, BN) (e.g., [Favaro & Santonastaso, 2000](#)); whereas other studies do not find significant differences between restrictive and binge eating/purging patients ([Claes, Vandereycken, & Vertommen, 2001, 2003](#); [Svirko & Hawton, 2007](#)).

The alarming high rate at which NSSI occurs in eating disorders, underscores the need for a better understanding of these behaviours ([Nock & Prinstein, 2004](#)). Associations with temperament have been frequently highlighted as promising avenues for understanding psychopathology ([Nigg, 2006](#)). According to the temperament model of [Rothbart \(1989\)](#), temperament can be defined as

individual differences in reactivity (i.e., excitability of the behavioural/physiological systems) and self-regulation (i.e., neural/behavioural processes functioning to modulate this underlying reactivity). Negative affectivity (i.e., proneness to experience feelings of anger, anxiety, and sadness) and extraversion/surgency (i.e., positive affectivity) are reactive temperament factors, and effortful control refers to self-regulatory processes ([Rothbart, 1989](#)). There is increasing evidence that vulnerability to psychopathology is associated with a personality characterized by extreme levels of reactivity in combination with low levels of effortful control (e.g., [Lonigan & Phillips, 2001](#); [Muris, Meesters, & Blijlevens, 2007](#); [Nigg, 2006](#)).

Based on the temperament model of [Rothbart \(1989\)](#) and [Baetens, Claes, Willem, Muehlenkamp, and Bijttebier \(2011\)](#) reported that community adolescents with NSSI scored significant higher on Negative Affectivity (NA) and lower on Effortful Control (EC) than adolescents without NSSI. In the same vein, several studies based on the Big Five Model (e.g., [Hasking et al., 2010](#); [MacLaren & Best, 2010](#)) showed that the presence and/or severity of NSSI in community samples was positively related to Neuroticism (which is viewed as similar to NA; [Nigg, 2006](#)) and negatively related to Conscientiousness (which is viewed as similar to EC; [Nigg, 2006](#)). Additionally, studies based on the UPPS Model of [Whiteside and Lynam \(2001\)](#) showed significant positive associations between NSSI and Negative Urgency (which is related to NA; [Whiteside & Lynam, 2001](#)) and Lack of Premeditation (which is related to EC; [Whiteside & Lynam, 2001](#)) ([Claes & Muehlenkamp, 2013](#); [Glenn & Klonsky, 2010, 2011](#)). Finally, [Lynam, Miller, Miller, Bornovalova, and Lejuez \(2011\)](#) showed that the interaction of Negative Urgency (NA) and lack of premeditation (the opposite of EC) was

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able to predict NSSI, such that the relation between Negative Urgency (NA) and NSSI was stronger among those low on Premeditation (EC). In clinical samples of eating disorder patients, similar results were found based on the Big Five (e.g., Claes, Vandereycken, & Vertommen, 2004) and the UPPS model (e.g., Peterson & Fischer, *in press*). Additionally, based on the Temperament and Character Model of Cloninger, Prybeck, Svrakic, and Wetzel (1994) and Claes et al. (2012), showed that male eating disorder patients with NSSI scored significantly higher on Harm Avoidance (which is related to high NA and low EC; Evans & Rothbart, 2007) and lower on Self-Directedness (which is related to high EC and low NA; Evans & Rothbart, 2007) compared to patients without NSSI; however, no studies investigated the association between NSSI and Rothbart's reactive and regulative temperament or their interaction in female eating disorder patients. Therefore, the first aim of the present study is to investigate the relationship between NSSI and Rothbart's reactive and regulative temperament dimensions as well as their interactions in a clinical sample of female ED patients.

Secondly, we focus on the association between temperament and NSSI functions in eating disorder patients. Nock and Prinstein (2004) proposed a framework for categorizing NSSI functions along two underlying dimensions. The first refers to the type of reinforcement the patient expects: patients may injure themselves to obtain a positive effect (positive reinforcement) or to avoid a negative effect (negative reinforcement). The second is the "source" of the expected effect: patients engage in NSSI to obtain an internal reward (self) or an external reward (social). Crossing both dimensions results in four NSSI functions: internal-positive reinforcement (e.g., NSSI to enjoy the pain), internal-negative reinforcement (e.g., NSSI to reduce negative affect), external-positive reinforcement (e.g., NSSI to get attention from others), and external-negative reinforcement (e.g., NSSI to escape from social demands). In a recent study, Claes and Muehlenkamp (2013) found the strongest relationship between the personality dimension Negative Urgency (related to NA) and the internal-negative reinforcement function of NSSI in a community sample of adolescents. As far as we know, no previous studies investigated the association between temperament and NSSI functions in (ED) patients. Therefore, the second aim of the present study was to replicate the four function model of NSSI in a sample of ED patients (2a), and to investigate the associations between temperament and NSSI functions in this sample (2b).

To summarize, the aims of the present study are twofold. Firstly, we examine the association between reactive and regulative temperament as well as their interactions with the presence/absence of NSSI. And secondly, we attempt to replicate the four function model of NSSI in ED patients (2a) and – expand the existing research – by investigating the associations between the temperament dimensions and the four NSSI functions (2b).

2. Method

2.1. Participants

Participants were 51 female eating disorder outpatients who were in treatment by clinical psychologists working in their private practices. Diagnoses were determined using the criteria of the eating disorder section of the DSM-IV-TR (APA, 2000) and cross-validated by means of the self-report Eating Disorder Inventory-2 (EDI-2; Garner, 1991). According to the DSM-IV-TR criteria, 19 (37.3%) patients were diagnosed with AN-Restrictive type (AN-R), 8 (15.7%) with AN binge/purging type, 19 (37.3%) with BN, and 5 (9.8%) EDNOS, but all of the latter engaged in daily or weekly binge eating and/or purging as determined by means of the EDI-2 Bulimia scale. In the current study, we will focus on comparisons be-

tween ED patients with AN-R ($n = 19$) on the one hand and ED patients with binge/purge symptoms (AN-BP, BN, EDNOS; $n = 32$) on the other hand. The mean age of the patients was 26.33 years ($SD = 9.03$), with no significant difference between AN-R patients ($M = 25.22$; $SD = 9.1$) and ED patients with binge/purging behaviours ($M = 27$; $SD = 9.07$), $F(1, 46) = .43$, *ns*. Consistent with expectations, the body mass index ($BMI = \text{weight in kg}/(\text{length in m})^2$) of patients with AN-R ($M = 17.23$, $SD = 1.74$) was significantly lower than the BMI of ED patients with binge/purging behaviours ($M = 22.84$, $SD = 6.76$), $F(1, 44) = 11.81$, $p < .001$.

2.2. Procedure

All patients visiting the private practices for the treatment of eating disorders were invited to participate in the study. All patients were provided with an envelope holding informed consent documents and questionnaires. Patients willing to participate provided written informed consent and completed the questionnaires individually at home. The documents were returned to the researcher in a sealed envelope via their individual therapist who had no access to participant responses. The study was approved by the ethical board of the psychology department of the first author. Participants were not compensated for participating in the study.

2.3. Instruments

NSSI was assessed using an adapted version of the Self-Injury Questionnaire-Treatment Related (SIQ-TR; Claes & Vandereycken, 2007b) which was developed to assess NSSI (functions) of ED patients. Patients responded to 6 yes/no items inquiring whether they had ever deliberately injured themselves by means of head banging, scratching, superficial cutting, severe cutting, hitting, and burning oneself. If they reported at least one act of NSSI, they were invited to answer 14 items assessing different functions served by NSSI on a scale ranging from 1 (*not at all applicable*) to 5 (*very much applicable*) (see Table 2 for item description).

The original 11 function items of the SIQ-TR were selected based on various models of NSSI functions which were described in the literature (e.g., Nock & Prinstein, 2004; Vanderlinden & Vandereycken, 1997) and which seemed to be suitable for ED patients who engaged in NSSI. These 11 items covered the internal-positive, internal-negative and external-positive reinforcement functions of NSSI described by Nock and Prinstein (2004). In the present study, 3 additional items (items 12, 13 and 14 in Table 2) were added to assess the external-negative reinforcement function of NSSI and to cover the complete four function model of Nock and Prinstein (2004). Claes and Vandereycken (2007b) investigated the reliability and validity of the SIQ-TR with 11 function items in a sample of 273 eating disorder patients and found three factors resembling Nock and Prinstein's (2004) internal-positive and negative and external-positive reinforcement functions, with alpha coefficients ranging from .65 to .70. Additionally, the internal-positive and negative reinforcement functions were positively related with the Anger-In scale ($r = .32$ and $.43$ respectively) and the external-positive reinforcement function was positively related with the Anger-Out scale ($r = .42$) of Spielberger, Krasner, and Solomon (1988).

The Adult Temperament Questionnaire-Short Form (ATQ-SF; Evans & Rothbart, 2007; Rothbart, Ahadi, & Evans, 2000) is a 77-item inventory designed to measure the four second-order temperament dimension of Negative Affectivity, Extraversion/Surgency, Effortful Control and Agreeableness (Rothbart, 1989). For the aim of the present study, only the first three temperament dimensions, corresponding with reactive and regulative aspects of temperament, were used. Each item of the ATQ-SF is rated on a 7-point

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