

Assessment of risk-behavior, impulsivity, self-harm and suicide ideation in adolescents
from the general population

Célia Barreto Carvalho^{a),b)}, Carolina Nunes ^{a)}, Paula Castilho^{b)}, Carolina da Motta^{a),b)},
Suzana Caldeira^{a)} & José Pinto-Gouveia ^{b)}

a) Division of Psychology, Department of Science Education, University of Azores, Azores, Portugal Rua Mãe Deus, Ponta Delgada 9500-321 PONTA DELGADA, Apartado 1422, PT - 9501-801 Ponta Delgada, Açores, Portugal. Telephone: (+351) 296650155

b) CINEICC, Faculty of Psychology and Education, University of Coimbra, Coimbra, Portugal

* Correspondence concerning this article should be addressed to: Célia Barreto Carvalho, Departamento de Ciências da Educação, Universidade dos Açores, Rua Mãe Deus, Ponta Delgada 9500-321 PONTA DELGADA, Apartado 1422, PT - 9501-801 Ponta Delgada, Açores, Portugal. Telephone: (+351) 296650155 E-mail: ccarvalho@uac.pt (Célia Carvalho)

Abstract

Non-suicidal self-injury (NSSI) is the deliberate, self-inflicted destruction of body tissue without suicidal intent and an important clinical phenomenon. Rates of NSSI appear to be disproportionately high in adolescents and young adults, and is a risk factor for suicidal ideation and behavior. The present study reports the psychometric properties of the Impulse, Self-harm and Suicide Ideation Questionnaire for Adolescents (ISSIQ-A), a measure designed to comprehensively assess the impulsivity, NSSI behaviors and suicide ideation. An additional module of this questionnaire assesses the functions of NSSI. Results of Confirmatory Factor Analysis (CFA) of the scale on 1722 youths showed item's suitability and confirmed a model of four different dimensions (Impulse, Self-harm, Risk-behavior and Suicide ideation) with good fit and validity. Further analysis showed that youth's engagement in self-harm may exert two different functions: to create or alleviate emotional states, and to influence one's social relationships. Our findings contribute to research and assessment on non-suicidal self-injury, suggesting that the ISSIQ-A is a valid and reliable measure to assess impulse, self-harm and suicidal thoughts, in adolescence.

Keywords: Adolescence, NSSI, suicide ideation, impulsivity, CFA, psychometric properties

1. Introduction

Adolescence is a developmental stage of profound transformations that may be stressful for the youngster, representing a great challenge in the use of coping strategies and general coping style (Stheneur, 2006; Hasking et al., 2013). Self-harm and suicide are major public health problems in adolescents, with rates of self-harm being highest in the teenage years and suicide being the second most common cause of death in young people worldwide. Borges and Werlang (2006) argued that the changes and conflicts that are normative in adolescence may result in youths resorting to aggressive, impulsive or even suicidal behaviors to cope with their problems. However, systematic research about this phenomenon is still insufficient (Alfonso and Dedrick, 2010), despite recent theoretical and empirical work having significantly advanced in the understanding of this pervasive behavior.

Several studies have shown that self-harming behavior is a significant problem (Madge et al., 2008, 2011) in adolescence, emphasizing the relationship between self-harming behaviors and suicide ideation (Mangnall and Yurkovich, 2008; Andover and Gibb, 2010), and the importance of impulsivity to self-harm (Hawton, 2002; Claes et al., 2010; Madge et al., 2011). Despite a number of studies concerning these issues, the underlying mechanisms to these behaviors are still unclear. As a consequence, awareness about this problem and the proper identification of individuals at-risk is hindered (Madge et al., 2008; Scoliers et al., 2009), constituting also an important obstacle to efficient intervention. Moreover, research concerning the effectiveness of therapeutic protocols, whether in clinical and non-clinical samples is still unexplored.

1.1. Non-suicidal self-injury (NSSI)

Harming oneself without the intention of dying is not a new phenomenon. NSSI behaviors, particularly in adolescence, have received a growing attention in clinical and research settings, but also in popular media (Lloyd-Richardson et al., 2007). The use of multiple terms to describe NSSI, such as “deliberate self-harm (DSH),” “parasuicide,” “self-injurious behavior,” “self-mutilation,” and “self-wounding,” in current literature is further complicated by the fact some of these definitions comprise NSSI with and without suicidal intent (Mangnall and Yurkovich, 2008). On the other hand, the presence of suicide intention in individuals who self-harm, and those definitions often vary according to the samples that are studied (Madge et al., 2008; Fliege et al., 2009). Nevertheless, a systematic review of previous studies point out to similar rates of DSH and NSSI suggesting that these studies may be comparable and refer to similar phenomena (Muehlenkamp et al., 2012).

Non-suicidal self-injury can be defined as the intentional and direct injuring of one's body tissue without suicidal intent (Herpertz, 1995; Muehlenkamp, 2005; Klonsky, 2007). This kind of behavior is most prevalent among adolescents and young adults, and typically involves cutting or carving the skin, with a consistent presentation across nations (May et al., 2012). Several studies have shown that 13% to 25% of adolescents and young adults surveyed in schools have some history of self-injury, and similar findings were found in a review by Muehlenkamp et al. (2012). Others studies, including clinical and community-based samples, revealed that self-harm tends to have its onset in adolescence, commonly occurring during the middle to late adolescence (13-15 years old), which reinforces this developmental stage as a period of difficulties in emotional regulation and risk-taking (Moran et al., 2012). Rates of NSSI appear to be disproportionately high in adolescents and young adults (Ross and Heath, 2002;

Whitlock et al., 2006): approximately 8% of children ages 12–14 (Hilt et al., 2008), 14–15% of adolescents (Ross and Heath, 2002; Laye-Gindhu and Schonert-Reichl, 2005), and 14–17% of college students (Favazza, 1989; Whitlock et al., 2006) report having self-injured. In adolescent inpatient samples, rates of NSSI appear to be 80% or higher (Nock and Prinstein, 2004). The most frequent presentations of NSSI include cutting the skin (reported by 70% of participants), scratching, burning, ripping or pulling skin or hair, pinching, hitting or breaking bones. Specifically, self-cutting is the most common method referred in Child and Adolescent Self-harm in Europe (CASE) (Madge et al., 2008), and other studies, present in 70% to 97% of individuals who self-harm (Suyemoto, 1998); followed by hitting oneself (21% to 44%); pinching, scratching or biting oneself (Ross and Heath, 2002). Other studies have found methods such as puncturing with pins or needles, severe scratching (Gratz, 2001) and burning oneself with cigarettes (Messer and Fremouw, 2008). Regarding body tissues, areas that are more accessible and easy to hide or conceal, such as arms, wrists, legs and belly, are more frequently reported (Nock et al., 2006).

Considering several phenomenological models for self-harm behavior (Suyemoto, 1998; Pelios et al., 1999; Joiner, 2005; Nock et al., 2006; Williams and Bydalek, 2007), individuals who engage in self-harming behavior seem to do it with specific goals, self-harm has a function or a result that is expected (Nock and Prinstein, 2004). Individuals can experience immediate relief, and biological evidence points out to an actual physiological stress reduction occurring after a self-harm episode (Bunclark, 2000). Those individuals experience daily negative emotions more often than individuals who do not self-harm. The negative emotional states and experiences may be the main reason to engage in self-harming behavior, as a way to relieve emotional distress (Fliege et al., 2009). In addition, similar to several psychopathologies and as recently acknowledged as

an independent condition in DSM-5, disruptive early attachment and interpersonal relationships in adolescence can act as risk and maintenance factors to NSSI (Skegg, 2005; Gratz, 2006; Fliege et al., 2009), and NSSI may arise as a maladaptive coping mechanism to both disruptive emotional states and experiences (Gilbert et al., 2009; Castilho and Gouveia, 2011; Castilho et al., 2013) and to interpersonal problems.

The functional approach by Nock and Prinstein (2004) proposes that NSSI behavior can be classified and treated according to the functional processes involved in the etiology and maintenance of this problematic behavior. The authors have proposed and assessed a model with four different functions divided in automatic reinforcement and social reinforcement. Automatic reinforcement function can serve the purposes of removing or creating feelings (Brown et al., 2002). It can, therefore, act as negative reinforcements (using NSSI as a strategy to alleviate stress or negative emotional states), which is the most frequent function evoked by people who self-harm (“to stop feeling bad”); or positive reinforcements (self-harm as a strategy to create a desirable physiological state – e.g. “To feel something, even if it is pain”). NSSI can also be used to modify or regulate the social environment. In the negative social reinforcement form, individuals tend to use self-harm to escape interpersonal demands (e.g. Avoiding punishment or avoiding doing something undesirable); in the positive social reinforcement form, individuals tend to gain attention or something from others (e.g. to have attention or having someone react to one’s behavior, even if negatively) (Nock and Prinstein, 2004). In the study by Nock and Prinstein (2004), the most frequent functions of NSSI endorsed by youths was automatic reinforcement, with most youths using NSSI to regulate (reduce or increase) emotional or physiological experiences.

1.2. NSSI, impulsivity, and risk behaviors

Clinical experience and some prior research suggest that impulsiveness is an important correlate of NSSI (Simeon et al., 1992; Herpertz, 1995; Herpertz et al., 1997). Recent research, found that individuals who engage in NSSI are more likely to engage in other impulsive behaviors, including binge eating, alcohol and/or drug abuse, sexual promiscuity, gambling, and others (Evans and Lacey, 1992; Herpertz et al., 1997). In addition, there is evidence that many self-injurers spend less than 5 minutes contemplating a self-injurious act (Nock and Prinstein, 2005). Thus, Impulsivity is a factor often referred to as being associated with NSSI (Hawton, 2002; Claes et al., 2010; Madge et al., 2011), with individuals who self-harm reporting more impulsivity than those who do not (Janis and Nock, 2009). Also, Madge and colleagues (2011), in a study with 30,477 adolescents between 14 and 17 years old have found that the factors that independently differentiate youths with and without history of NSSI is impulsivity, suicidal experiences or self-harm of others, physical or sexual abuse, and problems with sexual orientation. Hasking et al. (2013) provided further evidence of exposure to peers who self-harm being an important risk factor to engagement in such behaviors. Moreover, other studies have found that self-injurers and controls only differ for particular aspects of impulsivity (e.g., Future planning; Herpertz et al., 1997), that impulsivity correlates with the degree of NSSI among self-injurers but fails to distinguish injurers from controls (Simeon et al., 1992), and that impulsivity only distinguishes female, and not male, self-injurers from controls (Hawton, 2002). Recently, Glenn and Klonsky (2010) found that, among self-injurers, lack of perseverance (e.g., Inability to stay on a task until its completion, which is an impulsivity component) predicted recent and frequent NSSI. Despite the many suggestions that self-injurers are impulsive, research on impulsivity in NSSI has yielded

mixed results, further stressing the need to investigate the relationship and contribution of impulsive in the pathoplasticity of self-harm.

1.3. NSSI, suicide and risk behaviors

Empirical research has documented consistent and significant associations between NSSI and certain clinical correlates (e.g., Depression, anxiety, and BPD features), and a key issue to be resolved is the relationship between NSSI and suicidal behavior or thoughts.

Some authors refer that suicide attempts in youths are carried through impulsively, although many adolescents experience thoughts and suicidal behaviors without actually acting on them (Barrios et al., 2000). After puberty, suicide ideations tend to increase in frequency and intensity, with a prevalence of 15 to 25% during adolescence, which constitutes an indicator of suicide risk, as well as a significant predictor of suicide (Grunbaum et al., 2004; Vrshek-Schallhorn et al., 2011). Suicide ideation is the beginning of a continuum that goes from thinking or having recurring thoughts about ending one's life, through planning, preparation, threat and rehearsal of suicide, to the final stage of actually committing suicide (Kachur et al., 1995; Barrios et al., 2000; Bridge et al., 2006). However, suicidal thoughts may or may not exist prior to suicide (Park et al., 2010).

NSSI and suicidal behavior are both forms of self-injurious behavior, differentiated on the basis of intention, frequency, and lethality (Muehlenkamp and Gutierrez, 2007). At the same time, NSSI is a documented risk factor for suicidal behavior; elevated rates of suicidal ideation and behavior are consistently reported among self-injuring populations (Nock et al., 2006; Whitlock et al., 2006). Thus, despite the important differences between NSSI and suicidal behavior, however, research has shown that these behaviors can also co-occur among clinical and community-based samples (Nock and Prinstein,

2004; Nock et al., 2006; Andover and Gibb, 2010). Several authors pointed out that self-harm is often related to suicidal ideations and attempts, and, can precede suicide if untreated (Hawton et al., 1999; Hawton, 2002; Brausch and Gutierrez, 2010; Martin et al., 2010; Hamza et al., 2012; Zetterqvist et al., 2013), constituting the main risk factor for suicide (NHS, 1998). Moreover, approximately 50–75% of those with a history of NSSI make a suicide attempt at some point (Joiner, 2005; Nock et al., 2006), further highlighting the dangerousness of this behavior.

Finally, risk behaviors, although often associated with the presence of self-harm behavior or suicide ideation, are independent phenomena typically observed in adolescence (Boyer, 2006; Vrouva et al., 2010). It is important to stress that risky behavior is often explained by the vulnerability stemming in functional and anatomical development of the adolescent brain, which favors reward-seeking processes over competent decision-making (Steinberg, 2007). Risk-taking or risk behaviors are behaviors that may cause an undesirable or unpredicted outcome, instead of a behavior oriented to cause pain or damage the self.

1.4. Assessment

To date, several research studies on NSSI in adolescence has been conducted using measures to assess self-harm: FASM (Lloyd et al., 1997); SHI (Sansone et al., 1998); DSHI (Gratz, 2001) and DSHI-S (Lundh et al., 2007); SITBI (Nock et al., 2007); ISAS (Klonsky, 2009); RSHIA (Vrouva et al., 2010). However, many were developed and validated in clinical and non-clinical adult samples, and the psychometric properties of the adapted versions to youths were not thoroughly explored prior to administration in research with adolescent samples. To the best of our knowledge, most of these scales were adapted from measures originally studied in adult populations and administered to adolescents without further validation, while only the study on the adaptation of SHI to

adolescents has taken into account the need of further psychometric analysis and measure fit through Rasch Model analysis (Latimer et al., 2009). For instance, the DSHI-S consisted of DSHI items that were suppressed or merged together, and Cronbach's alpha were provided as indicators of reliability of this modified scale (Lundh et al., 2007; Bjärehed and Lundh, 2008). The use of Cronbach's alpha alone to estimate reliability is an often criticized practice (Schmitt, 1996; Sijtsma, 2009) and does not exclude the need to further validate and perform more complex structural analyses before applying a measure or a modified version of a measure to different populations. This also applies to self-report scales assessing suicidal ideation and behaviors, revealing a gap in the psychometric studies of these measures in adolescent populations. Regarding impulsivity, prior studies have relied primarily on self-report measures of impulsiveness (Evans and Lacey, 1992; Simeon et al., 1992; Herpertz et al., 1997) also due to the difficulty in organizing the multiple definitions of impulsivity into a comprehensive measure. In addition, research in cognitive and social psychology has revealed that people have a limited understanding of the mental processes involved in the evaluation, judgment, problem-solving and the initiation of behavior. For these reasons, this study is an attempt to surpass these limitations by developing a single and cost-effective measure that allows the assessment of a multiplicity of constructs related to NSSI (impulsivity, self-harm behaviors and suicidal thoughts), NSSI and their functions specifically that is a) aimed and validated in adolescent population, and b) is made available in Portuguese. It is noteworthy that Portuguese is the fourth most spoken language in the world by number of native-speakers (Lewis et al., 2014), and from all existing measures focusing on self-harm, to the best of our knowledge, RTSHIA is the only available tool that has been translated and studied in Portuguese-speaking samples. Thus, the availability of these tools is crucial for professionals across the five continents both in clinical and

research contexts. Specifically, the current study aimed to explore the dimensionality and the psychometric properties of ISSIQ –A in a large community adolescent non-clinical sample. Taking into account that adolescence is a developmental stage in which changes can occur at a fast pace, age differences concerning the assessed variables in ISSIQ-A will also be explored.

2. Methods

2.1. Participants and Procedures

Data was collected in private and public schools in S. Miguel Island, Azores. Prior to data collection, authorizations were requested to the Regional Department of Education (*Direcção Regional da Educação - DRE*), that granted the permission and provided the information on the total number of students and school councils for all schools in São Miguel island. In a first moment, school councils were contacted and agreed to cooperate in the current research project. Next, all classrooms were numbered and 50% of the students of each school year were stochastically drawn (through ballot box method) (Poeschl, 2006). In the second contact, classroom's directors would schedule two classes in which researchers could inform and supervise the questionnaire administration. In the first session, information on the study goals, anonymity, and confidentiality were provided to all participants, who were given a written informed consent form. In the second session, all students (or their legal representatives) that gave their informed consent were supervised by the researchers while filling the assessment protocol in the classroom. A total of 54 subjects (approximately 3% of the total sample) was excluded, for not conforming to the inclusion criteria (students over 21 years old) or whose parents denied authorization to participate.

The final sample was of 1722 adolescents, with ages between 14 and 21 years old ($M = 16.75$, $SD = 1.30$), 806 males (46.8%) and 916 females (53.2%). Students had completed between 5 to 12 years of education ($M = 10.48$, $SD = 1.32$).

2.2. *Item development*

All items of the ISSIQ-A were created after a careful literature review on self-harming behavior (e.g. Suyemoto, 1998; Ross and Heath, 2002; Nock and Prinstein 2004; Joiner, 2005; Madge et al., 2008; Mangnall e Yurkovich, 2008; Messer and Fremouw, 2008; Scoliers et al., 2009; Madge et al., 2011) and their relationship with impulsivity (Simeon et al., 1992; Hawton et al., 2002; Claes et al., 2010; Madge et al., 2011) and suicide ideation (Hawton et al., 1999; Madge et al., 2008; Fliege et al., 2009). The first version of ISSIQ-A had 64 items, grouped into 4 modules: A- Impulse (16 items), B- Self-harm (14 items), C – functions (31 items) and D – Suicide ideation (3 items). Items are rated in a 4-point Likert scale ranging from 0 = “*never*” and 3 = “*always*”, except for module C, which has a nominal (“*Yes*” or “*No*”) response scale.

Twenty youths were recruited for a preliminary study aimed to verify that all items and questionnaire instructions were comprehensible. Each participant, who filled out the questionnaire, was asked to share his/her impressions on any difficulties felt concerning instructions or item’s sentencing. The participants were able to understand the instruction in its original form, and the information provided by these participants concerning items’ contents allowed the authors to make the necessary changes to assure comprehensibility to younger populations.

2.3. *Measures*

Impulse, Self-harm and Suicide Ideation Questionnaire for Adolescents (ISSIQ-A; Barreto Carvalho et al., 2012). The ISSIQ-A development is the primary aim of the current study, validity and psychometric properties will be presented in the results section

(section 3.1 to 3.4). Higher scores in each module (factor) are indicators the presence of self-harm behavior, impulsivity and/or suicide ideations.

The Risk-taking and Self-Harm Inventory for Adolescent (RTSHIA – Vrouva et al., 2010; translated and adapted by Xavier et al., 2013).

The RTSHIA is a 34-items self-report inventory assessing the frequency of risk taking and self-harm behaviors in two dimensions: Risk-taking (RT – 8 items) and Self-Harm (SH – 18 items). Items are rated on a 4-point Likert scale (0 – Never, 3 – Very often).

Confirmatory factor analysis supports the two factor model of risk-taking and self-harm as two related, but not identical constructs (Vrouva et al., 2010). In that same study, the inventory internal consistency was high for both subscales ($\alpha = .85$ for RT and $\alpha = .93$ for SH) and test-retest reliability over a 3 month period was also good (RT = .90 and ST = .87). As previously stated, the RTSHIA is the only NSSI-related measure that has been adapted and validated in Portuguese samples. Studies with the Portuguese version also revealed good psychometric properties and internal consistency of the scale ($\alpha = .81$ for RT and $\alpha = .89$ for SH) (Paiva et al., 2013).

Early Memories of Warmth and Safeness Scale – adolescent version (EMWSS-A – Richter et al., 2009; translated and adapted by Cunha et al., 2013)

EMWSS-A is a 21-items self-report scale developed to assess memories of experiences of warmth and affection during childhood. Each item is rated on a 5-point Likert frequency scale (1 = rarely, 2 = sometimes, 3 = often, 4 = most times). It is a one-dimensional scale. Original validation studies by Richter et al., (Richter et al., 2009) presented good internal consistency ($\alpha = .97$) as well as in the Portuguese validations studies of this scale ($\alpha = .95$) (Cunha et al., 2014).

2.4. Statistical analysis

Data analysis was carried out using SPSS v. 20.0, Confirmatory Factor Analysis was carried out with Amos v. 20 (IBM, 2011) and MPLUS v6.12 (Muthén and Muthén, 2011). Quality of model adjustments were made through the following fit indices: Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), with reference values of adjustment above .90; Parsimony CFI with acceptable values above .06; Root Mean square Error of Approximation (RMSEA) below .05, and Akaike Information Criterion (AIC). The reference values are accordingly to those suggested by Kline (2010) and Maroco (Maroco, 2010). Construct reliability and validity was evaluated through Composite Reliability (CR) (Fornell and Larcker, 1981) and construct validity was assessed through Average Variance Extracted (AVE). Items' individual reliability was assessed through squared multiple correlations ($R^2 > 0.20$). Composite reliability values $\geq .70$ and AVE $\geq .50$ were adopted as indicators of good construct validity and reliability (Fornell and Larcker, 1981). The module referring to the functions of self-harm was treated separately, because items are categorical and do not follow a normal distribution. Therefore, fit estimations were based on an additional fit index: Weighted Root Mean Square Residuals (WRMR) (Yu, 2002; Muthen and Muthen, 2007; Hsu, 2009). Model invariance between genders were examined using CFI difference (Byrne, 2008), in which differences inferior to .01 are indicators of model invariance.

3. Results

3.1. Item analysis and scale dimensionality

Preliminary analysis on the scale reliability showed that the internal consistency of the total scale was good ($\alpha = .86$). Each subscale also presented acceptable to very good internal consistency: $\alpha = .76$ for the Impulse subscale, $\alpha = .91$ for Self-harm, and $\alpha = .82$ for suicide ideation. However, four reverse-coded items on the impulse subscale

presented consistency problems: items #6 (I finish the tasks I begin), #9 (I like to plan things ahead), #13 (I am a careful person) and #15 (It is easy for me to keep focus). Because these items were detrimental to the subscale's internal consistency, these items were removed from further analysis. The Impulse subscale was then constituted by 12 items that presented an internal consistency of $\alpha = .80$. The Function subscale was assessed by KR-20 and presented very good internal consistency ($\alpha = .94$).

In order to assess construct validity, Confirmatory Factor Analysis (CFA) was computed for 2 different models. The model first included 3 latent variables (Impulse, Self-harm, and Suicide Ideation), in which several items presented individual reliability problems. This has led to the creation of an alternative 4-factor model (including Impulse, Self-harm, Suicide Ideation and an additional Risk-behavior factor). In both models, items #7 (It is hard to control my emotions), 10 (I steal or mess with things I shouldn't in order to feel better), 11 (It is hard for me to stand still) and 16 (It is hard for me to wait in a line) presented very low factor loadings in the impulse variable ($R^2 < .20$). Because these items were also those that did not contribute significantly to the scales' internal consistency and seem to evaluate constructs that are related, but do not directly refer to impulsivity (e.g. hyperkinesia, defiant behaviors), these items were deleted from the analysis and the final Impulse subscale comprised 8 items.

All items loading freely on their hypothesized factor, except for one item per factor (set to 1 in order to fix the scale of the model). Model comparisons indicated that the initial 3-factor model had a poorer fit ($\chi^2_{(272)} = 4104.450, p = .000$; CFI = .797; RMSEA = .090, $P(\text{rmsea} \leq 0.05) = .000$; PCFI = .723; AIC = 4260.450) when compared to the 4-factor solution ($\chi^2_{(269)} = 3339.959, p = .000$; CFI = .838; RMSEA = .081, $P(\text{rmsea} \leq 0.05) = .000$; PCFI = .751; AIC = 3501.959). Therefore, further adjustments were calculated in the 4-factor model, freeing parameters based on the highest modification indices.

Correlations were established between the errors of items #8 and #6; #1 and #7; #3 and #4; #3 and #1; #1 and #2 from the self-harm factor, #1 and #2; #5 and #6 from the risk behavior; items #7 and #8 from the impulse factor. After freeing these 8 parameters, the model presented good fit indexes: $\chi^2_{(261)} = 2133.025$, $p = .000$; CFI = .901; RMSEA = .065, $P(\text{rmsea} \leq 0.05) = .000$; PCFI = .784; AIC = 2311.025. All items presented adequate individual reliability within their parent factor ($R^2 > .20$): Impulse = .21-.40; Self-harm = .43-.65; Risk behavior = .26 -.62; Suicidal ideation = .54-.67. Thus, all factors presented good Composite Reliability values ($\geq .70$): Impulse = .76; Self-harm = .90; Risk behavior = .80; Suicidal ideation = .82. Construct validity was assessed through AVE, with Self-harm and Suicide ideation presenting the highest consistency ($AVE_{\text{suicide ideation}} = .61$ and $AVE_{\text{self.harm}} = .55$) and risk-behavior and impulse presenting less adequate consistency values for exploratory studies ($AVE_{\text{risk-behavior}} = .41$ and $AVE_{\text{impulse}} = .29$) (Fornell and Larcker, 1981). Self-harm presented moderate or strong correlation with the three dimensions: Suicide ideation, $r = .341$; Impulse, $r = .351$; and Risk behavior, $r = .815$ ($p < .001$).

For the 31 items Functions of self-harm module, all items presented good internal reliability and adequate factor loading, and therefore all items were kept in further analysis. Based on item's content and the model proposed by Nock and Prinstein (2004), an initial 2-factor model was tested, grouping 24 items referring to Automatic Reinforcement (the goal of self-harm was to create an emotional state or to relieve disruptive emotional states) and 7 items referring to Social Reinforcement (self-harm was a way to manipulate social interactions, such as calling for help or revenging others). Model fit indexes for the proposed models suggested poor or adequate fit: $\chi^2_{(433)} = 1025.088$, $p = .000$; CFI = .988; TLI = .987; RMSEA = .028, $P(\text{rmsea} \leq 0.05) = 1.000$; and WRMR = 1.472. However, modification indices indicated that freeing some

parameters would improve the fit of this model. Therefore, adjustments were made by allowing the errors of some items to correlate between each other, as long as they were in the same factor: items #8 and #10, #11 and #12, #5 and #11, #11 and #13, #12 and #13, #5 and #12 and #29 and #30, all belonging to the Automatic Reinforcement factor. The adjusted model presented good model fit indices: $\chi^2_{(425)} = 767.041$, $p = .000$; CFI = .993; TLI = .992; RMSEA = .022, $P(\text{rmsea} \leq 0.05) = 1.000$; and WRMR = 1.203. Although WRMR index is slightly above the proposed cutoff value of 1, this index has only been studied through computer simulations (Yu, 2002), lacking further empirical testing with non-normal and categorical outcomes (Hsu, 2009). Nevertheless, overall model fit of traditional indices indicate very good adjustment.

Lastly, model invariance of the ISSIQ-A was tested between boys and girls, by comparison of a free model (unconstrained) to a constrained model where factor loadings and variance/covariances from the two groups. The CFI difference of .009 indicate model invariance of the measure for gender.

3.2. Reliability and validity

Reliability analysis was calculated for each factor in the final four factor solution and the Functions subscale: Impulse, $\alpha = .77$; Self-Harm, $\alpha = .90$; Risk behavior, $\alpha = .81$ and Suicide ideation, $\alpha = .82$; Functions of self-harm module presented $\alpha = .93$ for the Automatic Reinforcement and $\alpha = .77$ for Social Reinforcement subscale. All values are either good or very good indicators of the measure's reliability.

3.3. Convergent validity

Significant correlations were found between ISSIQ-A and RTSHIA in the expected sense: all correlations were positive, with Risk-behavior subscales of ISSIQ-A and RTSHIA presenting moderate correlations, as well as the Self-harm subscales of

RTSHIA and ISSIQ-A, indicating the convergence of the constructs on both subscales. The correlation between Risk behavior and self-harm were weaker in both scales. The Impulse scale of ISSIQ-A also presented moderate, but lower correlation to RTSHIA Risk-behavior subscale and, interestingly, a moderate correlation was also found between Suicide Ideation on ISSIQ-A and Self-Harm in RTSHIA (see Table 1).

(Insert table 1 about here)

Correlation coefficients were also calculated for the factors found in ISSIQ-A and Early Memories of Warmth and Affection. As expected, negative correlations were found between ISSIQ-A factors and other measures, although the associations were weak. The only exceptions, however, were the moderate negative correlations observed between Suicide Ideation and both memories of warmth and affection (see Table 2).

(insert table 2 about here)

3.4. Age differences in Impulsivity, Risk-behavior, Self-harm, and Suicidal Ideations

As a final step, age differences in ISSIQ-A factors were explored. The study sample was divided into four groups, according to their age: 15 or younger ($n = 293$); 16 years old ($n = 488$), 17 years old ($n = 492$) and 18 or older ($n = 449$). ANOVA analysis revealed differences between groups concerning Impulse and Self-harm. Post-hoc tests indicated that, concerning Impulse these differences were significant between the younger and older groups (15 years old or younger presented significantly higher scores than 18 or older youths). Regarding Self-harm, *post-hoc* tests showed that the groups of 16, 17 and 18 or older did not differ, but the younger group tended to score significantly higher than the remaining three groups (see Table 3). Significant differences were also

found between the functions of self-harm across different age groups: youths with 15 or less years old score significantly higher on Automatic Reinforcement than 18 or older youths and the younger group also score significantly higher than 17 and 18 or older youths on Social Reinforcement function of self-harm.

(insert table 3 about here)

4. Discussion

Non-suicidal self-injury (NSSI) behavior refers to the intentional self-destruction or alteration of body tissue without deliberate suicidal intent. Among adolescents, this strategy is an increasingly common response to manage or inhibit aversive emotions. Research assessing motivations for NSSI include, among other reasons, reduction of emotional states, numbness, distraction from emotions, and relief from loneliness (Herpertz et al., 1997; Suyemoto, 1998; Nock and Prinstein, 2005; Skegg, 2005; Klonsky, 2009). Across several studies, the most commonly reported reason for self-harm is to alleviate the intense negative affect (Gratz, 2001). Moreover, individuals who engage in self-harm report that these behaviors turn emotional pain into physical pain, allowing them to be more easily understood and coped with. In turn, the relationship between NSSI and suicide behaviors is complex, and there is a consistent evidence showing the association between self-injury and suicidality. In addition, NSSI is associated with impulsivity and impaired emotion regulation, to which impulsive behavior has been proposed as an important risk factor to self-harm.

Therefore, the primary purpose of this study was to develop a reliable measure of impulse, self-harm behavior and their respective functions and suicidal thoughts in adolescents (ISSIQ-A), and to test its factorial validity and psychometric properties. In addition, we intended to explore the relation between impulsivity, NSSI and suicide ideation and sociodemographic variables (e.g., age).

The initial version of ISSIQ-A presented 33 items initially developed to assess three different aspects: impulse, self-harm, and suicide ideation, and an additional 31-item module assessing the functions of self-harm. Structural equation modelling was used to confirm the questionnaire's latent structure through Confirmatory Factor Analysis. The initial three-factor model including Impulse, Self-harm and Suicide Ideation factors did not present satisfactory model fit, and an alternative model was tested. Therefore, a four-factor model was created considering several modification indexes indicating a possible cluster of items assessing risk-behaviors as an additional and distinct factor. This result may be explained to the extent to which adolescence is a period in which risk behaviors are normative, and can be better explained by neurocognitive development than by self-harm alone. In other words, risk behavior is attributed to the early development of the limbic system compared to the frontal lobe, the brain structure responsible for the regulatory functions of behaviors, which favors the manifestation of behaviors that induce immediate gratification without concern for their long-term consequences (Steinberg, 2007). Therefore, risk behaviors can mostly occur without a deliberate intention of harming the self, despite these phenomena being associated.

The final version of the ISSIQ-A obtained is composed of 25 items divided into 4 factors. Overall, the scale presents good internal consistency for all the dimensions in the 4 factor model. Convergent validity further stressed a distinction between self-harm and risk behavior assessed both by the ISSIQ-A and the RTSHIA items, as suggested by the weaker associations found between them in our study.

Concerning the Functions of NSSI section of, the 31 items were divided into 2 different motives/functions, *Automatic* and *Social reinforcement*, similar to the model proposed by Nock and Prinstein (2004). The final model presented a good internal consistency of both factors and construct validity.

The convergent validity analysis also pointed out to both functions of self-harm presenting significant negative associations with early memories of warmth and safeness, indicating that adolescents may engage in self-harming behaviors predominantly as a way to regulate their own emotions, but also may use it as a way to regulate or control their relationship with others. Regarding the suicide ideation subscale of ISSIQ-A, the results revealed that this subscale was negatively correlated with positive emotional memories of warmth and affection in childhood, indicating that the more these adolescents endorse on these positive memories, the less suicide ideation was present. Some studies found that when individuals feel insecure in their environments (or have negative emotional memories in childhood) tend to focus on and behave according to a more hierarchical view of themselves and others, fearing rejection and being more vulnerable to depression) and suicide (Gilbert et al., 2009; Carvalho et al., 2013). Further studies should explore this relationship between early attachment and the social functions of NSSI.

Concerning the differences of age in ISSIQ-A, the results showed that, although adolescence is a developmental period in which changes occur at a very fast pace, only impulse and NSSI (and their respective functions) presented significant differences between participants with different ages. As expected, impulsive behaviors decrease with age, and the same is true for non-suicidal self-injury behavior. Younger adolescent tend to resort more to self-harm both to regulate their own emotions and their relationships with others than their older counterparts. Given that this was found in the general population, it is possible that these results point to the development of more adaptive coping strategies as maturation occurs. These results point to future directions research, and further studies are being carried out to assess how NSSI, risk-behavior, impulsivity and suicidal thoughts change over wider age ranges (from youths to young adults up to 26 years old). This study has several strengths. First, to our knowledge, the ISSIQ-A is

the first scale to measure these behaviors simultaneously and several studies showed that they co-occur, and should be analyzed as the risk and maintenance factors of NSSI. From our standpoint, the construction and development of self-report instruments that allows a parsimonious measurement of these constructs constitutes an advantage in the assessment. Thus, the use of a self-report questionnaire such as the ISSIQ-A can be a cost-effective measure to be used both in clinical and research settings. Second, the scale presented very good psychometric proprieties and convergent validity revealing to be a reliable and valid instrument to use in clinical practice and research. Third, the validation of ISSIQ-A was carried out in a large and representative sample, comprising almost 50% of the adolescent population of the region. However, because this sample is from the general population of youths, the results of those who report more severe forms of self-harming behavior may have been “diluted” by those presenting none or few of these disruptive behaviors, which could explain the somewhat low averages in the ISSIQ-A subscales. Further studies using ISSIQ-A in clinical samples are a possible direction in exploring self-harm in youths with specific mental health problems and related phenomena. Considering that self-harm can be more covert behaviors (Williams and Bydalek, 2007), self-report questionnaire can be fundamental in the assessment and comprehension of this issue, and ISSIQ-A can be a useful tool that fills the existing gap in the existing measures (and specifically the lack of comprehensive instruments assessing self-harm and related constructs in Portuguese). The use of tools that can distinguish the different features and functions related to NSSI can bring important theoretical contributes in defining these constructs and underlying mechanisms, allowing the systematization of current knowledge in this matter, specifically in youths. In clinical settings, the use of a brief and multidimensional tool may guide the development of

specific psychotherapeutic protocols or programs targeting NSSI and related factors, as well as to assess the gains of these interventions.

Nevertheless, the limitations of this study should be taken into account. First, the cross-sectional design of the study does not allow to establish causal relationships between the variables. Second, test-retest reliability was not assessed as well as divergent validity. Future research should confirm the factor structure of the ISSIQ-A in different samples either from the general population (young adults) and from clinical settings (borderline personality, eating disorder, major depression) in order to investigate possible cutoff scores for the NSSI scales. Further studies should explore the psychometric properties of translated and adapted versions of the ISSIQ-A, so that future transcultural studies can aim at understanding this phenomenon across populations from more diverse cultural background. In addition, it would be important to complement the use of self-report questionnaires focusing on NSSI with other measures (physiological measures and interviews) and to further characterize NSSI behaviors, co-occurrences and correlations in the Azorean population, as increased rates of NSSI can be found on more isolated communities or remote geographical areas.

In sum, this study provides preliminary evidence that ISSIQ-A is a reliable and valid measure of Impulse, Self-harm and Suicide Ideation and thus its use is encouraged in clinical and research settings.

References

- Alfonso, M., Dedrick, R.F., 2010. Self-Injury among Early Adolescents. *American Journal of Health Education* 41, 74–84.
- Andover, M.S., Gibb, B.E., 2010. Non-suicidal self-injury, attempted suicide, and suicidal intent among psychiatric inpatients. *Psychiatry Research* 178, 101–5.

- Barrios, L.C., Everett, S.A., Simon, T.R., Brener, N.D., 2000. Suicide ideation among US college students. Associations with other injury risk behaviors. *Journal of American College Health* 48, 229–33.
- Bjärehed, J., Lundh, L.-G., 2008. Deliberate self-harm in 14-year-old adolescents: how frequent is it, and how is it associated with psychopathology, relationship variables, and styles of emotional regulation? *Cognitive behaviour therapy* 37, 26–37.
- Borges, V.R., Werlang, B.S.G., 2006. Estudo de ideação suicida em adolescentes de 15 a 19 anos. *Estudos de Psicologia (Natal)* 11, 345–351.
- Boyer, T., 2006. The development of risk-taking: A multi-perspective review. *Developmental Review* 26, 291–345.
- Brausch, A.M., Gutierrez, P.M., 2010. Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence* 39, 233–42.
- Bridge, J.A., Goldstein, T.R., Brent, D.A., 2006. Adolescent suicide and suicidal behavior. *Journal of Child Psychology and Psychiatry, and Allied Disciplines* 47, 372–94.
- Brown, M.Z., Comtois, K.A., Linehan, M.M., 2002. Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology* 111, 198–202.
- Bunclark, M.C.J., 2000. Repeated self-injury and its management. *International Review of Psychiatry* 12, 48–53.
- Byrne, B.M., 2008. Testing for multigroup equivalence of a measuring instrument: a walk through the process. *Psicothema* 20, 872–82.
- Carvalho, S., Pinto-Gouveia, J., Pimentel, P., Maia, D., Gilbert, P., Mota-Pereira, J., 2013. Entrapment and defeat perceptions in depressive symptomatology: through an evolutionary approach. *Psychiatry* 76, 53–67.
- Castilho, P., Gouveia, J., 2011. Auto-Criticismo: Estudo de validação da versão portuguesa da Escala das Formas do Auto-Criticismo e Auto-Tranquilização (FSCRS) e da Escala das Funções do Auto-criticismo e Auto-ataque (FSCS). *Psychologica* 63–86.
- Castilho, P., Pinto-gouveia, J., Duarte, J., 2013. Exploring Self-criticism : Confirmatory Factor Analysis of the FSCRS in Clinical and Nonclinical Samples. *Clinical Psychology and Psychotherapy*.
- Claes, L., Muehlenkamp, J., Vandereycken, W., Hamelinck, L., Martens, H., Claes, S., 2010. Comparison of non-suicidal self-injurious behavior and suicide attempts in patients admitted to a psychiatric crisis unit. *Personality and Individual Differences* 48, 83–87.

- Cunha, M., Xavier, A., Martinho, M.I., Matos, M., 2014. Measuring positive emotional memories in adolescents: Psychometric properties and confirmatory factor analysis of the Early Memories of Warmth and Safeness Scale. *International Journal of Psychology and Psychological Therapy* 14, 245–259.
- Evans, C., Lacey, J., 1992. Multiple self-damaging behaviour among alcoholic women. A prevalence study. *The British Journal of Psychiatry* 161, 643–7.
- Favazza, A., 1989. Self-Mutilation and Eating Disorders. *Suicide and Life-Threatening Behavior* 19, 352–61.
- Fliege, H., Lee, J.-R., Grimm, A., Klapp, B.F., 2009. Risk factors and correlates of deliberate self-harm behavior: a systematic review. *Journal of Psychosomatic Research* 66, 477–93.
- Fornell, C., Larcker, D., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* 18, 39–50.
- Gilbert, P., McEwan, K., Bellew, R., Mills, A., Gale, C., 2009. The dark side of competition: How competitive behaviour and striving to avoid inferiority are linked to depression, anxiety, stress and self-harm. *Psychology and Psychotherapy* 82, 123–36.
- Glenn, C.R., Klonsky, E.D., 2010. A multimethod analysis of impulsivity in nonsuicidal self-injury. *Journal of Personality Disorders* 1, 67–75.
- Gratz, K.L., 2001. Measurement of Deliberate Self-Harm: Preliminary Data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment* 23, 253–263.
- Gratz, K.L., 2006. Risk Factors for and Functions of Deliberate Self-Harm: An Empirical and Conceptual Review. *Clinical Psychology: Science and Practice* 10, 192–205.
- Grunbaum, J.A., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Lowry, R., Harris, W.A., McManus, T., Chyen, D., Collins, J., 2004. Youth risk behavior surveillance – United States, 2003. Morbidity and mortality weekly report. *Surveillance summaries (Washington, D.C.: 2002)* 53, 1–96.
- Hamza, C.A., Stewart, S.L., Willoughby, T., 2012. Examining the link between nonsuicidal self-injury and suicidal behavior: a review of the literature and an integrated model. *Clinical Psychology Review* 32, 482–95.
- Hasking, P., Andrews, T., Martin, G., 2013. The role of exposure to self-injury among peers in predicting later self-injury. *Journal of Youth and Adolescence* 42, 1543–56.
- Hawton, K., 2002. Deliberate self harm in adolescents: self report survey in schools in England. *BMJ* 325, 1207–1211.

- Hawton, K., Houston, K., Shepperd, R., 1999. Suicide in young people. Study of 174 cases, aged under 25 years, based on coroners' and medical records. *The British Journal of Psychiatry : the Journal of Mental Science* 175, 271–6.
- Hawton, K., Rodham, K., Evans, E., Weatherall, R., 2002. Deliberate self harm in adolescents: self report survey in schools in England. *BMJ* 325, 1207–1211.
- Herpertz, S., 1995. Self-injurious behaviour Psychopathological and nosological characteristics in subtypes of self-injurers. *Acta Psychiatrica Scandinavica* 91, 57–68.
- Herpertz, S., Sass, H., Favazza, A., 1997. Impulsivity in self-mutilative behavior: psychometric and biological findings. *Journal of Psychiatric Research* 31, 451–65.
- Hilt, L.M., Nock, M.K., Lloyd-Richardson, E.E., Prinstein, M.J., 2008. Longitudinal Study of Nonsuicidal Self-Injury Among Young Adolescents: Rates, Correlates, and Preliminary Test of an Interpersonal Model. *The Journal of Early Adolescence* 28, 455–469.
- Hsu, H.-Y., 2009. Testing the effectiveness of various commonly used fit indices for detecting misspecifications in multilevel structural equation models. Texas A&M University.
- Joiner, T., 2005. *Why People Die by Suicide*. Harvard University Press.
- Kachur, S., Potter, L., Powell, K., Rosenberg, M., 1995. Suicide: Epidemiology, Prevention, and Treatment. *Adolescent Medicine (Philadelphia, Pa.)* 6, 171–182.
- Kline, R.B., 2010. *Principles and Practice of Structural Equation Modeling*, Third Edit. ed. Guilford Press, New York.
- Klonsky, E.D., 2007. The functions of deliberate self-injury: a review of the evidence. *Clinical Psychology Review* 27, 226–39.
- Klonsky, E.D., 2009. The functions of self-injury in young adults who cut themselves: clarifying the evidence for affect-regulation. *Psychiatry Research* 166, 260–8.
- Latimer, S., Covic, T., Cumming, S.R., Tennant, A., 2009. Psychometric analysis of the self-harm inventory using Rasch modelling. *BMC psychiatry* 9, 53.
- Laye-Gindhu, A., Schonert-Reichl, K.A., 2005. Nonsuicidal Self-Harm Among Community Adolescents: Understanding the “Whats” and “Whys” of Self-Harm. *Journal of Youth and Adolescence* 34, 447–457.
- Lewis, P.M., Simons, G.F., Fennig, C.D. (Eds.), 2014. *Ethnologue: Languages of the World*, 17th ed. SIL International, Dallas, Texas.
- Lloyd, E., Kelley, M.L., Hope, T., 1997. Self-mutilation in a community sample of adolescents: Descriptive characteristics and provisional prevalence rates. Paper

presented at the annual meeting of the Society for Behavioral Medicine, New Orleans, LA.

- Lloyd-Richardson, E.E., Perrine, N., Dierker, L., Kelley, M.L., 2007. Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine* 37, 1183–92.
- Lundh, L.-G., Karim, J., Quilisch, E., 2007. Deliberate self-harm in 15-year-old adolescents: a pilot study with a modified version of the Deliberate Self-Harm Inventory. *Scandinavian Journal of Psychology* 48, 33–41.
- Madge, N., Hawton, K., McMahon, E.M., Corcoran, P., De Leo, D., de Wilde, E.J., Fekete, S., van Heeringen, K., Ystgaard, M., Arensman, E., 2011. Psychological characteristics, stressful life events and deliberate self-harm: findings from the Child & Adolescent Self-harm in Europe (CASE) Study. *European Child & Adolescent Psychiatry* 20, 499–508.
- Madge, N., Hewitt, A., Hawton, K., de Wilde, E.J., Corcoran, P., Fekete, S., van Heeringen, K., De Leo, D., Ystgaard, M., 2008. Deliberate self-harm within an international community sample of young people: comparative findings from the Child & Adolescent Self-harm in Europe (CASE) Study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines* 49, 667–77.
- Mangnall, J., Yurkovich, E., 2008. A literature review of deliberate self-harm. *Perspectives in Psychiatric Care* 44, 175–84.
- Maroco, J., 2010. *Análise de Equações Estruturais: Fundamentos teóricos, software & Aplicações*. ReportNumber, Lisbon.
- Martin, G., Swannell, S. V, Hazell, P.L., Harrison, J.E., Taylor, A.W., 2010. Self-injury in Australia: a community survey. *The Medical Journal of Australia* 193, 506–10.
- May, A., Klonsky, E., Klein, D., 2012. Predicting future suicide attempts among depressed suicide ideators: a 10-year longitudinal study. *Journal of Psychiatric Research* 46, 946–952.
- Messer, J.M., Fremouw, W.J., 2008. A critical review of explanatory models for self-mutilating behaviors in adolescents. *Clinical Psychology Review* 28, 162–78.
- Moran, P., Coffey, C., Romaniuk, H., Olsson, C., Borschmann, R., Carlin, J.B., Patton, G.C., 2012. The natural history of self-harm from adolescence to young adulthood: a population-based cohort study. *Lancet* 379, 236–43.
- Muehlenkamp, J.J., 2005. Self-injurious behavior as a separate clinical syndrome. *The American Journal of Orthopsychiatry* 75, 324–33.
- Muehlenkamp, J.J., Claes, L., Havertape, L., Plener, P.L., 2012. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health* 6, 10.

- Muehlenkamp, J.J., Gutierrez, P.M., 2007. Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of suicide research : official journal of the International Academy for Suicide Research* 11, 69–82.
- Muthen, L., Muthen, B., 2007. *Mplus user's guide*. 5th. Los Angeles, CA: Muthén & Muthén.
- NHS, 1998. Deliberate self harm. *Effective Health Care* 4, 1–12.
- Nock, M.K., Holmberg, E.B., Photos, V.I., Michel, B.D., 2007. Self-Injurious Thoughts and Behaviors Interview: development, reliability, and validity in an adolescent sample. *Psychological Assessment* 19, 309–17.
- Nock, M.K., Joiner, T.E., Gordon, K.H., Lloyd-Richardson, E., Prinstein, M.J., 2006. Non-suicidal self-injury among adolescents: diagnostic correlates and relation to suicide attempts. *Psychiatry Research* 144, 65–72.
- Nock, M.K., Prinstein, M.J., 2004. A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology* 72, 885–90.
- Nock, M.K., Prinstein, M.J., 2005. Contextual features and behavioral functions of self-mutilation among adolescents. *Journal of Abnormal Psychology* 114, 140–6.
- Paiva, A.C., Cunha, M., Xavier, A.M., Marques, M., Simões, S., Espírito Santo, H., 2013. 1513 – Exploratory study of risk-taking and self-harm behaviours in adolescents: prevalence, characteristics and its relationship to attachment styles. *European Psychiatry* 28, 1.
- Park, S.-M., Cho, S.-I., Moon, S.-S., 2010. Factors associated with suicidal ideation: role of emotional and instrumental support. *Journal of Psychosomatic Research* 69, 389–97.
- Pelios, L., Morren, J., Tesch, D., Axelrod, S., 1999. The impact of functional analysis methodology on treatment choice for self-injurious and aggressive behavior. *Journal of applied behavior analysis* 32, 185–95.
- Richter, a, Gilbert, P., McEwan, K., 2009. Development of an early memories of warmth and safeness scale and its relationship to psychopathology. *Psychology and Psychotherapy* 82, 171–84.
- Ross, S., Heath, N., 2002. A Study of the Frequency of Self-Mutilation in a Community Sample of Adolescents. *Journal of Youth and Adolescence* 31, 67–77.
- Sansone, R.A., Wiederman, M.W., Sansone, L.A., 1998. The Self-Harm Inventory (SHI): development of a scale for identifying self-destructive behaviors and borderline personality disorder. *Journal of Clinical Psychology* 54, 973–83.
- Schmitt, N., 1996. Uses and abuses of coefficient alpha. *Psychological Assessment* 8, 350–353.

- Scoliers, G., Portzky, G., Madge, N., Hewitt, A., Hawton, K., de Wilde, E.J., Ystgaard, M., Arensman, E., De Leo, D., Fekete, S., van Heeringen, K., 2009. Reasons for adolescent deliberate self-harm: a cry of pain and/or a cry for help? Findings from the child and adolescent self-harm in Europe (CASE) study. *Social Psychiatry and Psychiatric Epidemiology* 44, 601–7.
- Sijtsma, K., 2009. On the Use, the Misuse, and the Very Limited Usefulness of Cronbach's Alpha. *Psychometrika* 74, 107–120.
- Simeon, D., Stanley, B., Frances, A., Mann, J.J., Winchel, R., Stanley, M., 1992. Self-mutilation in personality disorders: psychological and biological correlates. *The American Journal of Psychiatry* 149, 221–6.
- Skegg, K., 2005. Self-harm. *Lancet* 366, 1471–83.
- Steinberg, L., 2007. Risk Taking in Adolescence: New Perspectives From Brain and Behavioral Science. *Current Directions in Psychological Science* 16, 55–59.
- Stheneur, C., 2006. Tentative de suicide : comment repérer un adolescent en danger ? *Journal de Pédiatrie et de Puériculture* 19, 218–222.
- Suyemoto, K.L., 1998. The functions of self-mutilation. *Clinical Psychology Review* 18, 531–554.
- Vrouva, I., Fonagy, P., Fearon, P.R.M., Roussow, T., 2010. The risk-taking and self-harm inventory for adolescents: development and psychometric evaluation. *Psychological Assessment* 22, 852–65.
- Vrshek-Schallhorn, S., Czarlinski, J., Mineka, S., Zinbarg, R.E., Craske, M., 2011. Prospective Predictors of Suicidal Ideation during Depressive Episodes among Older Adolescents and Young Adults. *Personality and Individual Differences* 50, 1202–1207.
- Whitlock, J.L., Powers, J.L., Eckenrode, J., 2006. The virtual cutting edge: the internet and adolescent self-injury. *Developmental Psychology* 42, 407–417.
- Williams, K.A., Bydalek, K.A., 2007. Adolescent self-mutilation: diagnosis & treatment. *Journal of Psychosocial Nursing and Mental Health Services* 45, 19–23.
- Yu, C., 2002. Evaluating Cutoff Criteria of Model Fit Indices for Latent Variable Models with Binary and Continuous Outcomes. University of California, Los Angeles.
- Zetterqvist, M., Lundh, L.-G., Dahlström, O., Svedin, C.G., 2013. Prevalence and function of non-suicidal self-injury (NSSI) in a community sample of adolescents, using suggested DSM-5 criteria for a potential NSSI disorder. *Journal of Abnormal Child Psychology* 41, 759–73.