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Cover Page Footnote

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**Implicit and explicit self-esteem as predictors of reactive and proactive aggression in
adolescent boys and girls**

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Implicit and explicit self-esteem as predictors of reactive and proactive aggression in adolescent boys and girls

Abstract

This study aims at examining gender differences and their association with implicit and explicit self-esteem (SE), and reactive and proactive aggression in adolescents. One hundred and eighteen adolescents (60 boys and 58 girls) performed the Implicit Association Test assessing implicit SE. The Rosenberg Self-Esteem scale was used to measure explicit SE. Reactive and proactive aggression were assessed with the self-report Reactive and Proactive Aggression Scale. Results showed that girls characterized by both low explicit and implicit SE (insecure SE), or by high explicit but low implicit SE (defensive SE), showed more reactive aggression than girls reporting high explicit and implicit SE (secure SE) or low explicit but high implicit SE (anxious SE). In contrast, none of these SE types were associated to reactive aggression in boys. Finally, no significant association was found between the different types of SE and proactive aggression, for both genders.

Keywords

Gender differences, implicit measures, self-esteem, reactive-proactive aggression, adolescents

Introduction

Adolescence refers to a period of important physical and psychological changes and of increased self-consciousness and awareness (Ryan & Kuczowski, 1994). In this context, several studies reported that self-esteem (SE) might be an appropriate indicator of how adolescents handle these challenges (Gonzalez, Casas, & Coenders, 2007). Moreover, SE is known to be associated with negative outcomes, notably aggressive behaviour (for a review, see Ostrowsky, 2010). Thus, adolescence is an optimal window of development for assessing the impact of SE on behavioural responses such as aggressive behaviour. The complex relationship between SE and aggression is being currently debated, as several studies have shown mixed results (for a review, see Baumeister, Smart, & Boden, 1996). Some studies found that low SE is a risk factor for aggressive behaviour (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005), whereas more recent ones revealed that high SE could also lead to aggressive behaviour (Bushman et al., 2009; Martinez, Zeichner, Reidy, & Miller, 2008). More specifically, three main factors could explain these discrepancies (Ostrowsky, 2010): gender (Webster & Kirkpatrick, 2006), the multifaceted nature of the construct of SE (general measure (Donnellan et al., 2005) vs. specific dimensions (Sakellaropoulo & Baldwin, 2007; Sandstrom & Jordan, 2008)) and the type of aggressive behaviour (Bushman & Baumeister, 1998; Martinez et al., 2008).

First, gender differences in emotional responses and coping mechanisms may lead male individuals to display more violent behaviour than females (Broidy & Agnew, 1997). However, recent studies have focused on the potential role of gender in the complex relationship between SE and aggressive behaviour as data indicate that rates of aggression are increasing among girls (Dahlberg, 1998). For example, Ostrowsky (2009) found that late adolescent girls with high SE

were more likely to be violent, whereas SE had no effect on violent behaviour among early and late adolescent boys. On the contrary, Baron (2007) demonstrated that low SE was related to violent crime in male youths only. This conflicting evidence for gender differences in the relationship between SE and aggression suggests that psychological features that can lead to aggressive behaviour, such as SE, are different in girls and boys and point out the necessity for further research to better understand the gender dynamics surrounding this particular relationship, especially in adolescents (Ostrowsky, 2010).

Second, previous research focusing on the construct of SE has initially relied on explicit measures of SE, such as interviews or self-report questionnaires (Diamantopoulou, Rydell, & Henricsson, 2008; Walker & Bright, 2009). However, several limitations – such as being biased by self-presentation strategies and bound to introspective limits (Fazio, Jackson, Dunton, & Williams, 1995) – could be imputed to explicit measures. To counter these limitations, some authors proposed to measure SE implicitly (Bosson, Swann, & Pennebaker, 2000; de Jong, Sportel, de Hullu, & Nauta, 2012). In this perspective, implicit SE could be defined as a highly efficient evaluation of the self that occurs unintentionally and outside of consciousness. Attitudes toward the self may be activated automatically, with little effort, just as are attitudes toward many social objects in people's environments (Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003). In particular, regarding gender differences, evidence demonstrated that girls and boys display similar levels of implicit SE (Miyamoto & Kikuchi, 2012; Sandstrom & Jordan, 2008). However, implicit beliefs seem to be more relevant in girls than boys (Pelham et al., 2005), suggesting that boys and girls may rely differently on these features. More recently, some studies using both explicit and implicit measures of SE revealed two distinct subtypes of SE: "secure" and "defensive". The secure type refers to people feeling good about themselves both consciously (explicit SE) and unconsciously (implicit SE). The defensive type would rather portray a subgroup of people who might feel good about themselves on a

superficial level (high explicit SE), but more fragile and negative on an unconscious level (low implicit SE) (Jordan et al., 2003; Kernis, Lakey, & Heppner, 2008). Individual presenting defensive SE have been shown to be more at risk to suffer from psychological problems (de Jong et al., 2012; Gemar, Segal, Sagrati, & Kennedy, 2001), psychopathological problems (Creemers, Scholte, Engels, Prinstein, & Wiers, 2012) and in particular to engage in aggressive behaviour (Sandstrom & Jordan, 2008). In what appears to be the only directly relevant study in line with our research, Sandstrom & Jordan (2008) found no links between children's implicit SE (using the IAT procedure) and teachers' reports of aggression, though they did find a relationship between discrepant implicit and explicit SE (namely defensive SE) and aggression. Additionally, to the best of our knowledge, no studies have yet explored the relations between all combinations of explicit and implicit SE (i.e. low explicit SE and high implicit SE, low explicit SE and low implicit SE, high explicit SE and low implicit SE, and high explicit SE and high implicit SE) and aggressive behaviours, separately in boys and girls.

Third, aggression is not a unitary concept. Therefore, a distinction between reactive and proactive aggression is essential to understand the relationship between SE and aggression. Reactive aggression is generally associated to negative emotions – such as anger or feelings of animosity – and aims at causing harm to others involving impulsivity and immediacy (Dollard, Miller, Ford, & Hovland, 1962). Proactive aggression is characterized as a planned, instrumental type of behaviour and is implemented in order to reach a personal goal or other types of benefits (Card & Little, 2006; Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007). Accordingly, the aetiology and psychological problems related to these different types of aggressive behaviour diverged (Bandura, 1986; Dollard et al., 1962). In fact, reactive aggression is rather related to negative outcomes, such as social maladjustment, peer rejection, impulsivity or to internalizing problems (Dodge & Crick, 1990). On the contrary, proactively aggressive children may feel more self-confident, be viewed by others as leaders (Crick &

Dodge, 1996; Dodge & Coie, 1987), and would thus be more likely to engage in delinquency and disruptive behaviours (Atkins & Stoff, 1993; Card & Little, 2006; Vitaro, Gendreau, Tremblay, & Oligny, 1998). Accordingly, proactive aggressive individuals might show higher SE, compared to reactive aggressive individuals, who tend to suffer from low SE. Recently, only a few studies have examined the relationship between SE and reactive and proactive aggression. Some studies found that narcissism, a personality trait that includes a high level of explicit SE (American Psychological Association, 1994), might be a risk factor for aggressive behaviour. While Barry, Grafeman, Adler, & Pickard (2007) suggest that narcissism is predictive of both proactive and reactive aggression, Seah et Ang (2008) found that this personality trait was only related to proactive aggression in adolescents. Another study has also demonstrated that only the state component of SE (i.e the intra-individual variability of SE over four days), but not the trait component (measured one time during the study) had a significant association with aggressive behaviour in preadolescent children (Lee, 2014). Even if these studies have shown that SE seems to be differently associated with reactive and proactive aggression in adolescents, they mainly relied on explicit measures of SE and, to our knowledge, no research has yet examined whether implicit SE could be a potential risk factor for reactive and proactive aggression in adolescents.

The present study

Due to unclear evidence concerning the relationship between gender differences, explicit SE and aggressive behaviour, as well as the limited amount of studies that focused on implicit/explicit SE and aggression, we conducted an exploratory study to investigate gender differences in the relationship between explicit/implicit SE and aggression. More specifically, the first aim is to examine the relationship between the two dimensions of SE (explicit and implicit) and aggression (both proactive and reactive) within a sample of community adolescents, by taking gender into account. The second aim is to examine the relationship

between all combinations of explicit and implicit SE (i.e. low explicit SE and high implicit SE, low explicit SE and low implicit SE, high explicit SE and low implicit SE, and high explicit SE and high implicit SE), and reactive/proactive aggressive behaviour in both boys and girls.

Method

Sample

One hundred and eighteen adolescents, aged 12 to 16 years (60 boys and 58 girls) were recruited in two secondary public schools in the French-speaking part of Switzerland. The mean age is $14.6 \pm .93$ and 82% were Swiss citizens, with French as their first language (80%). Given that all Swiss public schools are free of charge, they were not discriminatory regarding income. The sample of this study is thus representative of the socio-economic status (SES) of the Swiss population. The vast majority came from middle SES families (3% low SES, 94% middle SES, and 3 % high SES, based on the father's and mother's occupation). As shown in Table 1, girls and boys did not differ significantly on age, nationality, first language and SES.

Table 1.

Descriptive statistics for socio-demographic data.

	Girls (n=58)	Boys (n=60)	P-value ¹
Age (yrs)	14.43±1.07	14.70 ±.71	<i>ns</i>
Swiss nationals	86.2%	78.4%	<i>ns</i>
French first language	83.6%	78%	<i>ns</i>
SES			<i>ns</i>
Low	2%	3%	
Middle	96%	94%	
High	2%	3%	

Note. All data show mean values (\pm SD) or percentage. Results of t-tests or χ^2 tests as appropriate. Ns: non significant.

Measures

Explicit self-esteem was assessed with the 10-item self report questionnaire Rosenberg Self-Esteem Scale (RSE, Rosenberg, 1965). Every participant was invited to answer on a four-point Likert scale of importance ranging from 1 = “strongly disagree” to 4 = “strongly agree”. A mean score was computed from all the items and a high score indicates a high level of SE. The internal consistency analyses carried out on the study’s sample is satisfactory with a Cronbach α of .87.

Implicit self-esteem was measured using the Implicit Association Test (IAT) (Greenwald, McGhee, & Schwartz, 1998) which consists of a double computerized discrimination task in which participants are required to classify a single stimulus as fast as possible to a pair of target categories. The IAT effect relies on the assumption that participants will be faster to categorize

a stimulus when the two concepts sharing the same response key are associated in their mind, than when they are not sharing the same response key. The IAT assessing implicit SE, associated in the first task “me” and “good” on one response key, and “not me” and “bad” on the other, requesting participants to classify words belonging to one of these four categories in the relevant category as quickly as possible (such as classifying “myself” to “me”, “joy” to “good”, etc.) In contrast, the second task associated “me” and “bad” on one response key and “not me” and “good” on the other, again requesting participants to classify words belonging to one of these four categories in the relevant one as quickly as possible. Each task consists of 60 trials. The difference between the average response time in the first and second task is thought to reflect the strength of the association of the participants’ implicit attitudes. Namely, a positive score reflects a positive implicit SE, whereas a negative score reflects a negative implicit SE. The IAT procedure has been shown to have good psychometric properties. The reliability has been found to be excellent (Bosson, Swann, & Pennebaker, 2000; Cunningham, Preacher, & Banaji, 2001) and the test-retest and construct validity good (Bosson et al., 2000; Egloff, Schwerdtfeger, & Schmuckle, 2005; Lane, Banaji, Nosek, & Greenwald, 2007).

The improved scoring procedure¹ recommended by Greenwald, Nosek, and Banaji (2003) was used: the D was thus computed as the difference in average response latency between the two combined tasks of the IAT, divided by an average standard deviation of subjects’ response latencies in the two combined tasks.

¹ This new scoring procedure enables (1) to reduce the correlations between IAT effects and individual subjects’ average response latencies, (2) to minimize the effect of the order of the IAT blocks, and (3) to decrease the effect of previously completing one or more IATs on IAT scores, while retaining strong internal consistency. In addition, it has also been found to maximize the correlation between implicit and explicit measures (Lane, Banaji, Nosek, & Greenwald, 2007). Participants with more than 10% responses lower than 300ms were eliminated from the analyses (such extreme responses being considered as random), as well as participants with more than 20% of error responses. Moreover, for each participant, response latencies greater than 10000ms were replaced by the mean latency of the block to which 600ms were added. Following this procedure, no participants were excluded from the analyses.

Reactive and proactive aggression was assessed with the Reactive-Proactive Aggression Questionnaire (RPQ, Raine et al., 2006). This measure is a 23-item self-questionnaire of which 12 items are related to proactive aggression and 11 items are related to reactive aggression. Participants were asked to rate on a three-point Likert scale (0 = “never” to 2 = “often”), the extent to which they engage in the two forms of aggression. The RPQ comprises two specific sub-scales: the one on reactive aggression and the one on proactive aggression as well as a third sub-scale which is the sum of the two. The psychometric properties are very satisfactory, with Cronbach α higher than .81 for all three scales (Raine et al., 2006). As part of the present research, a French version of the RPQ has been developed. The internal consistency analyses carried out on the study’s sample are satisfactory ($\alpha = .73$ for the proactive aggression sub-scale and $\alpha = .75$ for the reactive aggression sub-scale).

Procedure

All procedures were approved by the local university ethics committee and are in compliance with the ethical code of the Swiss Society of Psychology (SSP). Agreements were obtained from the school principals and a written authorization was obtained from all of the students’ parents, prior to the beginning of the procedure. A second written consent was gathered from each participant after a comprehensive description of the study. Confidentiality of the data was guaranteed. Students willing to participate completed the IATs and the questionnaires individually within two class periods of 45 minutes and in the presence of trained psychologists.

Statistical analyses

First, data were explored with box plots which revealed no outliers. Then, skewness and kurtosis were explored. For the explicit, implicit, and reactive aggression scores, the data

followed normal distribution allowing for parametric testing. The proactive aggression scores did not follow a Gaussian distribution, thus we applied a logarithmic transformation. The transformed variable (RPQ_proactivelog) was used in all analyses². First, gender differences were tested for the different variables using independent t-tests. Then, multiple regression analyses were performed to examine the influence of explicit and implicit SE on reactive aggression, as well as on proactive aggression. Afterwards, to further investigate these links, four groups of SE were created based on the scores obtained on the IAT and the Rosenberg Self-Esteem Scale: Participants were initially separated into high and low explicit SE (i.e. median split RSE score), and into high and low implicit SE (i.e. median split on the IAT score). Then, four combined groups were constituted: *Secure SE* (high explicit and implicit SE, girls: $n=13$; boys: $n=14$), *Defensive SE* (high explicit and low implicit SE, girls: $n=13$; boys: $n=11$), *Anxious SE* (low explicit and high implicit SE, girls: $n=16$; boys: $n=18$) and *Insecure SE* (low explicit and implicit SE, girls: $n=16$; boys: $n=17$). Analyses of variances (ANOVA) were carried out to compare the four combined groups of SE on the reactive and proactive aggression scales. In the event of a main effect of groups, post-hoc tests were conducted with Bonferroni correction.

Results

Descriptives

The means and standard deviations of the measures are shown in Table 2. Girls reported less proactive aggressions ($t_{(71)}=-4.97, p<.001, d=1.23$), but similar levels of implicit SE ($t_{(71)}=-1.49, ns$) explicit SE ($t_{(71)}=-1.53, ns$) and reactive aggression ($t_{(71)}=.483, ns$) than boys.

Table 2.

² Non parametric analyses (Mann–Whitney test) have been conducted to confirm the results found with the transformed variable (RPQ_proactivelog) regarding gender differences on this variable.

Descriptive data

	Girls (n=24)	Boys (n=49)	P-value ¹
RPQ_Reactive	.76 ±.26	.72 ±.30	<i>ns</i>
RPQ_Proactive	.05 ±.08	.23 ±.19	<.001
Implicit SE	.43 ±.41	.58 ±.40	<i>ns</i>
Explicit SE	3.01 ±.55	3.25 ±.50	<i>ns</i>

Note: RPQ_reactive and RPQ_proactive: Reactive and Proactive Aggressive Scale, implicit self-esteem: Implicit Association Test, explicit self-esteem: Rosenberg Self-Esteem scale. All data show mean values (\pm SD). ¹ Results of t-tests. Ns: non significant.

Multiple regression analyses

As demonstrated in Table 3 (part A), the multiple regression analyses show significant results in the girls' group only ($F_{(2,57)} = 5.19, p < .01$). On the whole, this statistical model explains 16% of the reactive aggression score variance. Specifically, explicit SE and implicit SE significantly predict reactive aggression in girls. On the contrary, in the boys' group, the model did not show any significant association between explicit SE, implicit SE and reactive aggression ($F_{(2,59)} = 1.01, ns$).

As with regards to proactive aggression (see Table 3 part B), no significant associations were found in girls ($F_{(2,57)} = .739, ns$) nor in boys ($F_{(2,59)} = .561, ns$) between explicit SE, implicit SE and proactive aggression.

Table 3.

Results of multiple regression analyses: for reactive aggression (part A) and for proactive aggression (part B).

A)

	Reactive aggression					
	Girls			Boys		
	B	SE	β	B	SE	β
Explicit SE	-.15	.07	-.28*	-.09	.09	-.13
Implicit SE	-.27	.11	-.30*	-.07	.10	-.10

Girls: $R^2 = .16$ ($p = .009$), Boys: $R^2 = .03$ ($p = ns$)

B)

	Proactive aggression					
	Girls			Boys		
	B	SE	β	B	SE	β
Explicit SE	.01	.02	.04	.03	.05	.09
Implicit SE	-.04	.03	-.15	-.06	.06	-.13

Girls: $R^2 = .03$ ($p = ns$), Boys: $R^2 = .02$ ($p = ns$)

Note. : Explicit SE: Explicit self-esteem, Implicit SE: Implicit self-esteem

* $p < .05$

ANOVAs

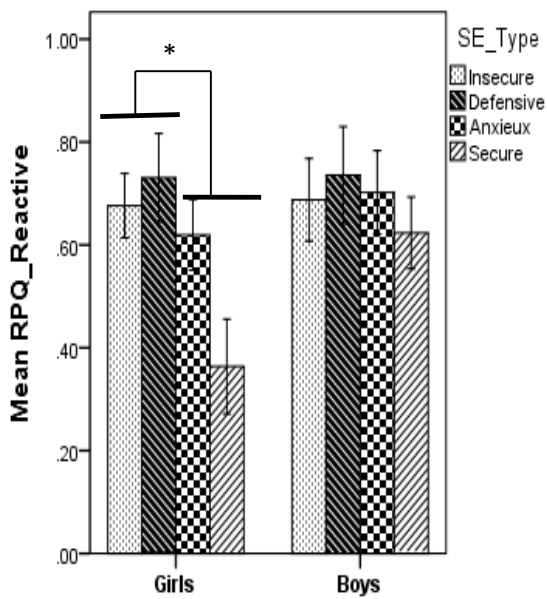
To further examine the importance of both types of SE on reactive aggression in girls, ANOVAs were computed to test the effect of the four combined groups of SE (secure, defensive, anxious, and insecure SE) on reactive as well as on proactive aggression (see Figure 1). Results revealed significant differences in the girls' group ($F_{(3,57)}=4.15$, $p \leq .01$). Post hoc tests with Bonferonni correction indicated that girls characterized by insecure SE, as well as by defensive SE (respectively, $M=.68$, $SD=.25$; and $M=.73$, $SD=.31$) reported more reactive aggression than girls characterized by anxious SE and secure SE ($M=.62$, $SD=.27$; and $M=.36$, $SD=.31$, respectively, all p 's $< .05$). In contrast, no differences were observed for boys in

reactive aggression between the four groups of SE ($F_{(3,59)}=.286, ns$). Similarly, no significant association was found for the four combined types of SE and proactive aggression, independent of gender.

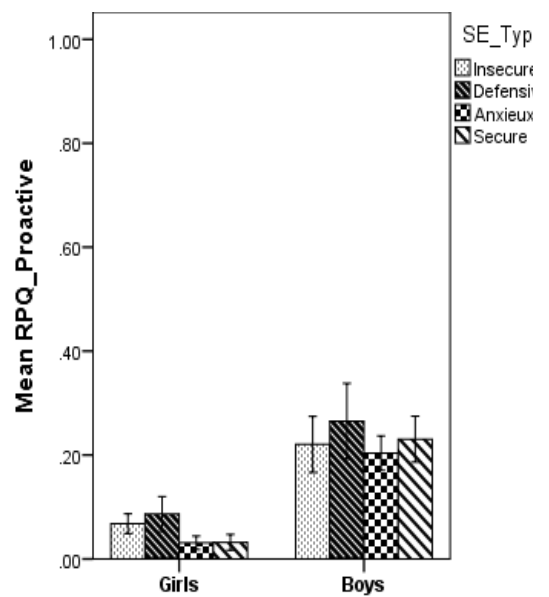
Figure 1.

Comparison of the four SE types on 1) reactive aggression, 2) proactive aggression, separately for girls and boys

1)



2)



Note: RPQ_reactive and RPQ_proactive: Reactive and Proactive Aggressive Scale; SE_type: Self-Esteem type. Data expressed in mean \pm standard error.

* $p < .05$

Discussion

The main purpose of this exploratory study was to examine the associations between implicit and explicit SE and proactive versus reactive aggression in adolescent boys and girls.

To sum up, results of this study show marked gender differences in the relationship between SE and reactive/proactive aggressions, with both explicit and implicit SE being significantly associated with reactive aggression in girls, but not in boys. More precisely, girls with low implicit SE, associated with either low or high explicit SE (i.e., insecure or defensive SE) report more reactive aggression than girls with high implicit SE, associated with either high or low explicit SE (i.e. secure or anxious SE). These findings suggest that low implicit SE is a core feature of reactive aggression in girls. Interestingly, these relationships were not observed in boys. No type of SE (neither implicit SE, nor explicit SE) seems to predict reactive aggression in male participants. In addition, in both boys and girls, proactive aggression was not related to any type of SE. Finally, the comparison between genders revealed that boys and girls differed only in terms of the level of proactive aggression.

Findings of the present study are in line with previous studies which already evidenced that SE is related to aggression (Ostrowsky, 2010). However, our results provide new information about the importance of considering implicit SE in the occurrence and/or maintenance of reactive aggression. While this study demonstrates that both types of low SE – explicit and implicit – are related to higher levels of reactive aggression in girls, our results also indicate that implicit SE is a better predictor of reactive aggression than explicit SE in girls.

Though boys and girls display the same frequency of reactive aggression, results indicate that adolescent girls reporting low explicit and implicit SE (insecure SE), and high explicit but low implicit SE (defensive SE) were more prone to display reactive aggression than boys. Our results are in line with previous studies which have already established that defensive SE (low implicit SE associated with high explicit SE) is related to more anger suppression in female adults (Schroeder-Abe, Rudolph, & Schuetz, 2007). Another study has also evidenced that low implicit SE is an important predictor for social anxiety or loneliness

(Creemers et al., 2012; de Jong et al., 2012), specifically in girls. This suggests that implicit beliefs are more relevant in girls than boys. To explain this gender difference, previous studies established that girls rather rely on automatic associations and self-judgment as a guideline for their behaviour (Pelham et al., 2005) and tend to have more emotional self-insight than boys (Pacini & Epstein, 1999). In contrast, boys would rather consider automatic associations as irrelevant. A recent study showed that males would not integrate uncomfortable and distressful events in their automatic beliefs, whereas females reflect and memorize not only events that are comfortable and pleasant, but also the uncomfortable and distressful ones (Miyamoto, 2011). Nonetheless, future studies investigating the influence of implicit SE in boys and girls and its consequences on aggressive behaviour are warranted to investigate this issue.

Another interpretation for the observed links between implicit SE and reactive aggression in girls may be due to the fact that boys and girls consider aggression as serving different functions. While boys tend to view it as a means to obtain something or to exercise power on, girls tend to consider aggression as a way to express their anger and distress (Campbell, Muncer et Gorman 1993). With this perspective in mind, we could argue that adolescent girls, known to be more emotionally unstable than boys (Ojanen, Findley, & Fuller, 2012), might feel more often attacked than boys would, and, as a result, would be more prone to react impulsively (i.e. using reactive aggression) in order to defend their threatened SE. Explicit SE is thought to be shaped through rational and conscious processing of self-relevant stimuli, whereas implicit SE is assumed to be shaped through more automatic and intuitive processing of past affective experiences (Dijksterhuis, 2006; Epstein & Morling, 1995). Therefore implicit tasks assessing SE, such as the IAT, would measure the “ideal of self”, and explicit SE would be more indicative of the more recently formed concept of “actual self” (Creemers, Scholte, Engels, Prinstein, & Wiers, 2013). Previous studies have already shown that discrepancies between

these two dimensions might cause people to feel trapped between ideals and “reality” leading to behavioural problems (Brinol, Petty, & Wheeler, 2006; Creemers et al., 2012) and notably aggressive behaviours (Sandstrom et Jordon, 2008). Our findings rather suggest that adolescent girls do not only react aggressively when they experience distress due to the discrepancy between their implicit and explicit SE (defensive SE), but also when they experience distress due to low levels of explicit and implicit SE (insecure SE). Again, further studies in larger community samples are warranted to examine this issue.

Finally, another explanation to the gender differences observed in the relationship between low implicit SE and reactive aggression, is that SE may have a different meaning for boys than it has for girls (Schwable et Stapples, 1991). In this study, a global measure of implicit and explicit SE was used. It might be possible that boys and girls derived their overall evaluation of themselves from different domains. Moreover, gender role socialization created different expectations for the way boys and girls behave and think about themselves (Eagly et Wood, 1991). In this perspective, boys and girls may have different value systems to judge themselves upon, so that low implicit SE in girls may not be equivalent to low implicit SE in boys. To confirm this interpretation, future research should investigate implicit/explicit global SE as well as domain-specific SE in order to better understand the issue regarding gender differences in the complex relationship between low implicit SE and aggressive behaviour.

Our results also show evidence that girls, compared to boys, reported similar levels of explicit SE (Miyamoto & Kikuchi, 2012; Sandstrom & Jordan, 2008) and implicit SE (de Jong et al., 2012; Sandstrom & Jordan, 2008). Although findings regarding implicit SE are quite consistent in the literature with no gender differences observed on this type of SE, results are mixed regarding explicit SE. While most of the studies showed that gender differences vary across dimensions of explicit SE, those examining explicit global SE did not find extremely

large gender differences, indicating that boys and girls generally display similar levels of explicit SE (Gentile et al., 2009).

Lastly, with regards to the two types of aggression, our study indicates that girls reported similar levels of reactive aggression but lower rates of proactive aggression compared to boys. This finding confirms previous studies that already established that aggression tends to take different forms among girls compared to boys. Reactive aggression is the most common form of aggressive behaviour in animals and underlies most human violence (Meloy, 1988). From this point of view, reactive aggression can be viewed as a quasi-normative behaviour indicating an adaptive reaction to current challenges encountered by both genders. In contrast, proactive aggression represents a particularly pathological form of aggression (Raine, 2006) and it has already been demonstrated that rates of proactive aggression are higher in male than in female adolescents, probably due to their increasing physical advantages (Fung, Raine, & Gao, 2009).

Some limitations of the present study need to be acknowledged. First, given its exploratory nature and the modest size of our gender groups, a replication in a larger sample of adolescent girls and boys is needed to confirm our findings. Second, the cross-sectional nature of our data precludes causal interpretations. Therefore the temporal relation between types of SE and aggression outcomes needs further clarification with longitudinal studies. A third limitation is the low levels of proactive aggression found in our sample. As mentioned earlier, reactive aggression can be viewed as more adaptive and quasi-normative, while proactive aggression would be more pathological (Raine et al., 2006). Therefore, it is not surprising to find a low frequency of proactive aggression in our study, which evaluated community adolescents. Further studies should investigate such relationships in clinical samples of adolescents in order to clarify the impact of both types of SE on proactive aggression.

Despite these limitations and the exploratory nature of this study, our findings may have several clinical implications. First, they suggest that boys and girls may need different types of intervention to help them handle their aggressive behaviour. Our results provide new evidence that special attention should be given to girls' implicit SE when designing interventions for the treatment of aggression. In this line, any intervention regarding aggression should take gender into account, as well as individuals' explicit and implicit self-view. Second, the findings of the present research suggest that it may be important for clinicians to be able to assess the degree and the nature of the discrepancies between implicit and explicit SE. Therefore developing a complementary assessment tool focusing on implicit information might be a promising and helpful challenge for professionals involved with aggressive adolescents. Finally, designing interventions that focus on enhancing implicit SE seems of particular interest for the treatment of aggression, specifically in girls. In this regard, Cognitive Bias Modification (CBM) interventions hold particular promise. During the past decade, a set of computerized training programs has been developed aimed at altering automatic cognitive biases, collectively called CBM. In these programs, participants are systematically trained to interpret emotionally ambiguous information in a functional way (e.g. learning to interpret ambiguous situation as safe rather than dangerous). Recent findings suggest that implicit associations could also be modified using CBM. For instance, implicit SE was increased by a computer game, which repeatedly paired self-relevant information with a smiling face (Baccus, Baldwin, & Packer, 2004). These findings provide a promising and challenging new field of intervention for adolescent girls displaying aggressive behaviour.

Conclusion

Reactive aggression is the most common form of aggression found in adolescents and more research is needed to understand the complex nature of the relationship between

aggression and SE. Findings of the present study show marked gender differences in the relationship between implicit/explicit SE and reactive/proactive aggression. This is the first study to suggest that implicit SE is a better predictor of reactive aggression in girls, while it is not the case in boys. Although there is a need for further research to confirm our findings and examine gender differences and the role of implicit SE in reactive aggression more clearly, clinical interventions aiming at reducing aggression could benefit from our findings by considering gender differences and how individuals view themselves implicitly and explicitly.

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