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Social cognition as mediator of romantic breakup adjustment in young adults who experienced childhood maltreatment

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Résumé

Objectifs : Déterminer si : 1) la maltraitance durant l'enfance et divers aspects de la cognition sociale (régulation émotionnelle, mentalisation, attributions causales) sont associés à l'adaptation à la rupture amoureuse chez les jeunes (résilience, symptômes psychiatriques, détresse); 2) la cognition sociale agit comme médiateur dans la relation entre la maltraitance durant l'enfance et l'adaptation à la rupture amoureuse. **Méthode** : Nous avons évalué la maltraitance durant l'enfance, la cognition sociale et l'adaptation à la rupture amoureuse chez 483 étudiants universitaires ayant vécu une rupture durant les trois derniers mois. Des régressions linéaires et analyses de médiation ont été effectuées. **Résultats** : 1) La maltraitance est associée à l'adaptation à la rupture lorsque les médiateurs sont considérés dans le modèle ($p < .001$) et lorsqu'ils ne le sont pas ($p < .001$). La régulation émotionnelle a eu des résultats significatifs sur les trois mesures d'adaptation à la rupture ($p < .001$) alors que la mentalisation et le contrôle personnel n'ont donné des résultats significatifs que sur la résilience ($p < .001$; $p = .004$) et les symptômes psychiatriques ($p = .002$; $p = .014$). 2) La maltraitance était indirectement associée aux mesures d'adaptation par la régulation émotionnelle (les intervalles de confiance excluaient 0). Elle était aussi indirectement associée aux symptômes par la mentalisation, tandis qu'elle était indirectement associée aux trois mesures d'adaptation par la mentalisation liée à soi (les intervalles de confiance excluaient 0) **Conclusions :** Les jeunes ayant vécu de la maltraitance durant l'enfance qui ont récemment vécu une rupture pourraient bénéficier d'interventions visant à améliorer la régulation émotionnelle et la mentalisation.

Mots-clés : maltraitance durant l'enfance, cognition sociale, rupture amoureuse, jeunes, régulation émotionnelle, mentalisation

Abstract

Aim: Investigate whether: 1) childhood maltreatment and various aspects of social cognition (emotional regulation, mentalization and causal attributions) are associated with romantic breakup adjustment in youth (i.e. resilience, psychiatric symptoms, and distress); and 2) social cognition mediates the relationship between self-reported exposure to childhood maltreatment and adjustment to romantic breakup. **Methods:** We assessed history of childhood maltreatment, social cognition and romantic breakup adjustment in a sample of 483 university students who experienced a romantic breakup during the last three months. Linear regressions and mediation analyses were computed. **Results**: 1) Childhood maltreatment was associated with romantic breakup adjustment when mediators were considered in the model ($p < .001$) and when they were not ($p < .001$). Only emotional regulation was significantly linked with all three measures of breakup adjustment ($p < .001$), while mentalization and personal control demonstrated significant relationships with resilience ($p < .001$; $p = .004$) and psychiatric symptoms ($p = .002$; $p = .014$) only. 2) Childhood maltreatment was indirectly associated with the three measures of romantic breakup adjustment through emotional regulation (all CI exclude 0). Childhood maltreatment was indirectly associated with psychiatric symptoms through mentalization, while childhood maltreatment was indirectly associated with all romantic breakup adjustment measures through self-related mentalization (all CI exclude 0). **Conclusions:** Youth with a history of childhood trauma who recently experienced a romantic breakup could benefit from interventions aimed at enhancing emotional regulation skills and mentalization skills.

Key words: childhood maltreatment, social cognition, romantic breakup, youth, emotional regulation, mentalization

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BSI   Brief Symptom Inventory

CDSII   Causal Dimension Scale

CERQ   Cognitive Emotion Regulation Questionnaire

CI   Confidence interval

CTQ-SF   Childhood Trauma Questionnaire Short-form

CYRM   Child and Youth Resilience Measure

EC   Effect coefficient

ES   Effect size

LL   Lower level

OLS   Multiple ordinary least-squares

PTSD   Posttraumatic stress disorder

UL   Upper level

1. INTRODUCTION

There are few stressors that have a greater impact on youth[1] social functioning than a non-desired romantic breakup. A romantic breakup can generate several psychological challenges, including depression and suicidal ideation (Brassard, St-Laurent Dubé, Gehl, & Lecomte, 2018). Distress linked to breakups has been documented in young university students (Field, Diego, Pelaez, Deeds, & Delgado, 2009). For these youth, breaking up with a partner can lead to increased sleep disturbances (insomnia), intrusive thoughts, and anxiety. Romantic breakup in youth can also lead to more intense emotions like obsessions, compulsions, frustration, rage, and aggression (Fisher, Brown, Aron, Strong, & Mashek, 2010). Moreover, a romantic breakup can be the trigger, for some, of a major depressive episode (Monroe, Rohde, Seeley, & Lewinsohn, 1999). Romantic breakups are not only one of the main causes of distress in adolescents and young adults (Chung & Hunt, 2014), but they are also one of the main reasons for psychological consultations in heterosexual adults (Frazier & Cook, 1993). A romantic breakup can also have a deleterious impact on one's physical health. In fact, a romantic breakup has been considered a cause of morbidity factors including broken heart syndrome (physical pain in the heart or chest) and immune dysfunction (greater incidence of illness linked to increased stress/cortisol) (Field, 2011). Interestingly, a functional magnetic resonance imaging study demonstrated that the brain reacts in a way similar to withdrawal from cocaine following a romantic breakup (Fisher et al., 2010). Therefore, evidence implies that, far from being trivial, romantic breakup can significantly impact youth functioning.

Furthermore, many youth tend to use negative coping strategies following a romantic breakup. Indeed, youth often cope with heavy drinking and marijuana use

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[1] Youth refers to adolescents and young adults under the age of 25.

(Fleming, White, Oesterle, Haggerty, & Catalano, 2010; Larson & Sweeten, 2012). A romantic breakup is also directly related to negative coping strategies such as antisocial behavior and increase in offending among males (Larson & Sweeten, 2012). On the other hand, some youth use positive coping strategies following a romantic breakup such as seeking social support (Chung et al., 2003). These differences might be explained by risk factors and protective factors. It is thus important to better understand the potential factors that influence youth's resilience or distress following a romantic breakup.

Among potential variables linked to romantic breakup adjustment, some studies have identified childhood maltreatment, such as physical, psychological, sexual abuse or neglect, as a risk factor for distress following a breakup. Childhood maltreatment has been documented as predicting worse coping strategies when faced with adversities such as romantic breakups. Indeed, a study on marital functioning in youth found that marital dissatisfaction and the probability of romantic breakup was higher among those who experienced childhood maltreatment (Whisman, 2006). Moreover, the severity of a posttraumatic stress disorder (PTSD) from a past trauma, like childhood maltreatment, predicted higher levels of posttraumatic stress symptoms and psychological comorbidities following a romantic breakup (Studley & Chung, 2015). PTSD from a past trauma was also associated with lower levels of wellbeing following a romantic breakup (Chung & Hunt, 2014).

Yet, some youth reporting childhood maltreatment are resilient and do not show any significant distress following a romantic breakup. Other than having better social networks (Dumont & Provost, 1999), little is known about the protective factors or personal characteristics of youth who are more resilient following a romantic breakup whether they were exposed to childhood maltreatment or not. Given its link with social functioning and with childhood maltreatment, social cognition is a concept of interest.

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Indeed, childhood maltreatment has been documented as being implicated in a multitude of social cognition processes in both clinical samples of adults (Brassard, Darveau, Péloquin, Lussier, & Shaver, 2014) and non-clinical samples of children and adults (Fonagy et al., 2006; Nazarov et al., 2014; Pears & Fisher, 2005; Vézina-Gagnon, Daigneault, Daignault, & Dupré, 2016).

Social cognition is a multi-dimensional concept born from cognitive psychology. Social cognition refers to various cognitive processes underlying social behavior. This construct comprises several complex functions such as: recognizing emotions, intentions and cognition in self and others (also known as mentalization); mastering strategies to self-regulate when faced with difficult emotions; emotional processing; social perception and knowledge; theory of mind; and attribution bias (Bellack et al., 2007; Green et al., 2008; Lysaker et al., 2010; Penn et al., 1997; Penn et al., 2008). Many elements of social cognition have been studied in the context of adjustment to adversities such as childhood maltreatment and romantic breakup.

Emotional regulation, a type of self-regulation necessary for optimal social cognition, has been extensively studied. Many authors have attempted to identify different predictors or correlates of emotional regulation skills. However, literature shows that children, adolescents, and adults who have experienced childhood maltreatment have fewer emotional regulation skills (Burns, Jackson, & Harding, 2010; Dvir, Ford, Hill, & Frazier, 2014; Kim & Cicchetti, 2010; Kolk & Fisler, 1994). Furthermore, emotional regulation is linked to resilience following traumatic events, fewer mental health problems, and better overall adaptation (Berking & Wupperman, 2012; Troy & Mauss, 2011). In a romantic relationship context, emotional dysregulation is associated with more romantic relationship conflicts (Kim, Pears, Capaldi, & Owen, 2009).

Mentalization, one of various processes implicated in social cognition, has also been studied in the context of adjustment to adversities. In fact, mentalization fosters mental health and is associated with resilience in youth and adults (Stein, 2006). However, mentalization skills vary considerably between individuals. These differences in mentalization skills can partly be explained by previous history of adversities such as childhood maltreatment. For instance, it has been found that children and adults who experience childhood maltreatment tend to present more mentalization deficits than those without such childhood experiences (Fonagy et al., 2006; Stein, 2006). In a romantic relationship context, study results have revealed that mind-reading (also known as theory of mind or others-related mentalization) accuracy in dating couples is related to higher relationship satisfaction and closeness (Thomas & Fletcher, 2003), indicating that mentalization has a role in romantic relationship functioning. Therefore, we can hypothesize that mentalization could have an impact on functioning following a romantic breakup as well.

In the same way, attributional styles and how they might influence one's adjustment to life's adversities have also been extensively studied in social cognition. For example, female survivors of childhood sexual abuse who presented external attributions (perceiving the cause as external to oneself) of blame were more resilient than those who presented internal attributions (Valentine & Feinauer, 1993). Thus, attributional style could act as a protective factor following adversity. An individual's attributional style is known to influence romantic breakup adjustment as well. Indeed, people who attributed the responsibility of an unwanted romantic breakup to themselves (i.e. internal negative attribution) reported greater grief over the breakup, greater depressive symptoms, and greater anxiety than those who did not feel entirely responsible (Boelen & Reijntjes, 2009).

Therefore, attributional style also seems to act as a protective factor in the context of adjustment to a romantic breakup.

Many processes involved in social cognition described above have been studied as mediators between childhood maltreatment and social functioning. For instance, emotional regulation has been documented as a mediator between childhood maltreatment and romantic relationship satisfaction, i.e. individuals who experienced more childhood maltreatment reported more emotional regulation difficulties and, in turn, less satisfaction in their romantic relationships (Bradbury & Shaffer, 2012). Similarly, emotional regulation has been found to mediate the relationship between childhood maltreatment and intimate partner abuse among men (Gratz, Paulson, Jakupcak, & Tull, 2009). Moreover, a recent study revealed that mentalization acted as a mediator between childhood maltreatment and depression in adolescents and young adults suffering from various psychiatric disorders (Belvederi Murri et al., 2017). Despite many studies revealing the mediating role of several social cognitive functions between childhood maltreatment and social functioning, we failed to find any studies investigating social cognition and childhood maltreatment simultaneously in the context of a romantic breakup. Given that most mental illnesses develop relatively early in life and that a romantic breakup can be a significant trigger, a better understanding of the factors leading to distress or resilience following a romantic breakup is warranted in youth who experienced childhood maltreatment.

In light of prior limitations, the goals of the current study were to investigate whether: 1) childhood maltreatment and various aspects of social cognition (emotional regulation, mentalization, and causal attributions) are associated with romantic breakup adjustment in youth (i.e. resilience, psychiatric symptoms, and distress); and 2) social cognition mediates the relationship between self-reported exposure to childhood maltreatment and adjustment to a romantic breakup. Consistent with previous findings, we

first hypothesized that childhood maltreatment and social cognition would be associated with romantic breakup adjustment in youth. Specifically, we believed that childhood maltreatment, as well as poor social cognition, would be associated with more difficulties following a romantic breakup in youth. Furthermore, we also hypothesized that a significant indirect association between childhood maltreatment and levels of resilience, psychiatric symptoms, and distress would emerge through all three measures of social cognition (mediation model, see Figure 1). Precisely, we believed that youth who experienced childhood maltreatment would report difficulties following a romantic breakup that could be partly explained by deficits in social cognition.

2. METHOD

2.1 Participants

The sample consisted of a convenience sample of 483 students from the Faculty of Arts and Sciences at a large Canadian university who had experienced a breakup in the last three months. Participants were aged between 18 and 25 years ($M = 22.05$ years) and 81.2% were female. The majority (65.2%) described their ethnicity as Canadian, while the rest described it as mostly European (14.8%). All had to be fluent in French.

2.2 Procedures

Following approval from the ethics review board of the Faculty of Arts and Sciences of the University, students were invited to participate in an online survey (on the survey platform Qualtrics) about romantic breakup adjustment. The link to the survey was shared through different student Facebook groups (e.g., psychology, sociology). The link was also sent by email to all graduate students in psychology. The inclusion and exclusion criteria (experienced a breakup in the last three months, aged between 18 and 25 years, Faculty of Arts and Sciences student) were mentioned when the link was shared on

Facebook or by email. The questionnaire took on average 25 minutes to complete. Participants were assured of the confidentiality of their answers and personal information. Students had the opportunity to participate in a contest to win an Ipad, a bookstore gift card or coffee shop gift card in exchange for their participation in the study.

2.3 Measures

2.3.1 Childhood maltreatment

Experiences of trauma in childhood were assessed using the Childhood Trauma Questionnaire Short-form (CTQ-SF) (Bernstein et al., 1994; Paquette, Laporte, Bigras, & Zoccolillo, 2004). This 25-item version measures history of abuse and neglect during childhood on a 5-point Likert scale. Paquette and colleagues (2004) validated the French version of the questionnaire with a non-clinical sample aged between 14 and 44 years old. The internal consistency was adequate for all scales ($\alpha = .68 - .91$) and the test-retest reliability was satisfying as well ($r = .73 - .94$). The construct validity was also established. Results of these studies reveal good psychometric properties in a non-clinical population aged between 14 and 44 years as well as a clinical population. The Cronbach's alpha for the overall CTQ-SF scores was excellent in the current study (.91). A total score ranging from 25 to 125 was used, with higher scores indicating more childhood trauma/maltreatment.

2.3.2 Emotional regulation

The French version of the Cognitive Emotion Regulation Questionnaire (CERQ) (Acremont & Van der Linden, 2007; Garnefski, Kraaij, & Spinhoven, 2001) was used to assess emotional regulation. The questionnaire is composed of 36 items and assesses regulation strategies for negative events on a 5-point Likert scale. This questionnaire contains items based on appropriate regulation strategies (acceptance, positive refocusing, refocus on planning, positive reappraisal, putting into perspective) and inappropriate

strategies (self-blame, rumination, catastrophizing, blaming others). The questionnaire has good psychometric properties and has been validated in many countries (Acremont & Van der Linden, 2007; Garnefski, Kraaij, & Spinhoven, 2001; Hasani, 2010; Zhu et al., 2008). Acremont and Van der Linden (2007) validated the French version of the questionnaire in a sample of young people aged between 13 and 19 years old. This version had an adequate internal consistency with Cronbach's alphas larger than .62, as well as satisfying construct validity. In the current study, the Cronbach's alpha for overall CERQ scores was also adequate ($\alpha = .87$). A global score ranging from 36 to 180 was used to test the hypotheses with higher scores indicating more appropriate regulation strategies.

2.3.3 Mentalization

Mentalization was measured by the Mentalization Scale (Dimitrijević, Hanak, Altaras Dimitrijevic, & Jolić Marjanovic, 2017). The Mentalization Scale contains 28 items. The items measure self-related mentalization, others-related mentalization, and motivation to mentalize on a 5-point Likert scale. The English version has an adequate internal consistency with a sample of people from the community ($\alpha = .74-.79$), as well as satisfying construct validity. For the current study, we translated the questionnaire into French with the back translation technique (Brislin, 1970). This French version proved to have an adequate internal consistency, similar to the English version, with a Cronbach's alpha of .86. Internal consistency was also adequate for the subscales: self-related mentalization ($\alpha = .78$), others-related mentalization ($\alpha = .76$) and motivation to mentalize ($\alpha = .70$). Analyses were performed first using the global score ranging from 28 to 140 and again with each subscale scores separately. Higher scores indicate more mentalization skills.

2.3.4 Causal attributions

We used a modified version of the Revised Causal Dimension Scale (CDSII) (Fontayne, Martin-Krumm, Buton, & Heuzé, 2003; McAuley, Duncan & Russell, 1992). Results of previous studies reveal good psychometric properties. The French version of the questionnaire validated by Fontayne and colleagues (2003) had satisfying internal consistency (α = .69 − .89) with a sample of college students, as well as satisfying construct validity and criterion related validity. In the current study, we adapted the first two questions to fit the topic of our study: "Think about your last romantic relationship breakup. In general, do you consider that this breakup was a positive or negative event?" and "What is THE main cause (ONE CAUSE) that can explain the breakup?" For the next 12 questions, respondents were asked to rate, on a scale of 1 to 9, the locus of causality (internal or external to the person), the stability of the cause that had just been mentioned (varies or not over time), the external level of control (controllable or uncontrollable by others) and the personal level of control (controllable or uncontrollable by oneself). We used only these four variables for analysis: locus of causality, external level of control, personal level of control, and stability. The Cronbach's alphas in the current study were satisfying with .88 for locus of causality, .79 for stability, .87 for external level of control. and .80 for personal level of control. In accordance with the authors' recommendation to treat each subscale independently, analyses were repeated for all four variables of interest and no composite scores were created. Each subscale contains 3 items and has a score ranging from 3 to 27 with higher scores indicating that the cause is external to the person (locus of causality), the cause varies over time (stability), the cause is uncontrollable by others (external level of control) and the cause is uncontrollable by oneself (personal level of control).

2.3.5 Resilience

Resilience was measured with the French version of the Child and Youth Resilience Measure (CYRM) (Daigneault, Dion, Hébert, McDuff & Collin-Vézina, 2013; Ungar et al., 2008) which contains 28 items. The items measure individual, relational and contextual resilience on a 5-point Likert scale. The French version validated by Daigneault and colleagues (2013) had satisfying test-retest reliability on the three types of resilience after three months, i.e. individual/social, family and community resilience (r = .75, .70, .76), as well as an adequate internal consistency (α = .88, .78, .64). The construct validity was also established and there is no floor or ceiling effect. The Cronbach's alpha for overall CYRM scores in the current study was excellent (.89). The global score was used to test the hypotheses ranging from 28 to 140. Higher scores indicate more resilience.

2.3.6 Psychiatric symptoms

For the measurement of psychiatric symptoms, the French version of the Brief Symptom Inventory (BSI) (Derogatis, 2001; Gosselin & Bergeron, 1993) was used. This questionnaire assesses psychological distress and psychiatric disorders within 18 items on a 5-point Likert scale. The psychometric properties were deemed to be excellent in several past studies with different populations (clinical population, students, etc.) and with people of several nationalities (Pereda, Forns, & Peró, 2007). The French version validated by Gosselin and Bergeron (1993) demonstrated adequate internal consistency for the overall BSI score (α = .96). Convergent validity was supported by correlational analyses with scales measuring similar constructs. In the current study, the Cronbach's alpha for the overall BSI scores was satisfying (.90). Global scores were used to test the hypotheses ranging from 18 to 90. Higher scores indicate more psychiatric symptoms. Every two days, the responses to the questionnaires were verified. If a participant answered "very" or "very much" to question 17 (question concerning suicide) of the Brief Symptom Inventory, we

had anticipated that a psychologist in our team would contact the participant and ensure that the person be directed to the appropriate services. This situation did not occur.

2.3.7 Distress

We measured distress following a romantic breakup with an item developed for the current study, which went as follows: "How are you feeling right now?" The question had 10 answer choices on a 10-point Likert scale where 1 was "not good at all" and 10 was "I feel great". Lower scores suggested more distress while higher scores indicated less distress.

2.4 Data analysis

To verify the first hypothesis, linear regressions were computed using IBM SPSS 25. To test the second hypothesis (mediation model), multiple ordinary least-squares (OLS) regressions were computed using model 4 (Figure 1) from Process (Hayes, 2013) with IBM SPSS 25. Indirect mediation effects were tested using 10,000 resampling bias-corrected bootstrap confidence interval (CI). When 0 was not included in the interval, they were considered statistically significant. The level of confidence was 95% for all analyses. In order to calculate the global score of each scale, we only considered participants who answered three-quarter of the items, leading to a final reduced sample of 362 participants.

3. RESULTS

3.1 Descriptive statistics

Descriptive statistics revealed that 7.3% of participants reported experiencing childhood maltreatment. Statistics showed that 66.9% of participants used emotional regulation skills "Regularly" or "Almost always" ($M = 3.22$; $\sigma = .46$; range 1 to 5). For the Mentalization scale, 36.6% of respondents reported that they used mentalization skills ($M = 3.8$; $\sigma = .44$; range 1 to 5). For the causal attributions measure, 42% reported that the

cause was internal (themselves; $M = 5.36$; $\sigma = 2.65$; range 1 to 9), 44.8% of participants said that the cause of the breakup was unstable (stability; $M = 4.77$; $\sigma = 2.25$; range 1 to 9), 44.4% reported that the cause was external (the other's fault; $M = 5.17$; $\sigma = 2.66$; range 1 to 9), and 35.6% believed they could not influence the cause ($M = 5.62$; $\sigma = 2.21$; range 1 to 9). For resilience, 89% of participants reported being on average "Moderately" to "Very much" resilient ($M = 3.68$; $\sigma = .52$; range 1 to 5). Finally, 8.5% indicated experiencing psychiatric symptoms on average "Moderately" to "Extremely" ($M = 1.94$; $\sigma = .67$; range 1 to 5) and 20.9% of respondents reported experiencing distress following the romantic breakup ($M = 6.57$; $\sigma = 2.29$; range 0 to 10).

3.2 Linear regressions

Table I shows results for the direct association (when we do not consider mediators in the model) of childhood maltreatment on the three measures of breakup adjustment (path c in figure 1). Statistically significant (all CI exclude 0) results showed that childhood maltreatment scores were always associated with outcomes. This suggests that participants who experienced more childhood maltreatment were less resilient and had more psychiatric symptoms and more distress following a romantic breakup than those who experienced less childhood maltreatment. Based on Cohen's (2008) criteria, effect sizes for resilience was considered large ($R^2 \geq .25$), while between medium ($R^2 \cong .09$) and large for psychiatric symptoms, and between small ($R^2 \cong .01$) and medium for distress. Effect sizes indicated that childhood maltreatment was associated (in descending order) with resilience, psychiatric symptoms and distress, when mediators were not considered. Table I also shows results for the direct association between childhood maltreatment and the three measures of romantic breakup adjustment (path c' in figure 1). Results revealed that childhood maltreatment was still significantly associated with all three measures when the mediators were included in the model. Effect sizes for resilience and psychiatric

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symptoms were considered to be medium ($R^2 \cong .09$) and large ($R^2 \geq .25$), respectively, and small ($R^2 \cong .01$) for distress (Cohen, 2008). These analyses indicated that the inclusion of the mediators reduces the effect size of childhood maltreatment on all three measures of romantic breakup adjustment.

Results pertaining to the direct association between social cognitive measures and romantic breakup adjustment measures (path b in figure 1) showed that only emotional regulation had statistically significant effects on the three measures of breakup adjustment (coefficients are as follow: resilience = .28, $p < .001$; psychiatric symptoms = -.5, $p < .001$; and distress = 2.32, $p < .001$) while the global score of mentalization and that of personal control had significant effects only on resilience (mentalization = .3, $p < .001$; and personal control = .03, $p = .004$) and psychiatric symptoms (mentalization = -.21, $p = .002$; and personal control = -.4, $p = .014$). This means that participants with more emotional regulation skills were more resilient, had fewer symptoms and felt less distress following the romantic breakup. Participants with more mentalization skills were more resilient and experienced fewer psychiatric symptoms, as did participants who saw the cause as not controllable by oneself. No significant effect was found for locus of causality, stability and external control on resilience, psychiatric symptoms and distress.

3.3 Mediation analyses

Table II shows regression coefficients for the indirect effects of childhood maltreatment on resilience, psychiatric symptoms, and distress following the romantic breakup through all six social cognition measures (path ab in figure 1). Statistically significant coefficients (all CI exclude 0) revealed that childhood maltreatment was indirectly associated with the three measures of romantic breakup adjustment through emotional regulation. The coefficient of determination (R^2) indicated that emotional regulation in the mediation model explained 9.2% (resilience), 12.9% (psychiatric

symptoms) and 20.3% (distress) of the variance in outcomes. Also, childhood maltreatment was indirectly associated with psychiatric symptoms through mentalization. Mentalization in the mediation model explained 5% (psychiatric symptoms) of the variance in outcomes. The ratio of indirect to total effect of childhood maltreatment on all three romantic breakup adjustment outcomes (effect size for the mediation effects) revealed that emotional regulation carried 11% (resilience), 20% (psychiatric symptoms) and 50% (distress) of the childhood maltreatment total effect, and that mentalization carried 4% (psychiatric symptoms) of the childhood maltreatment total effect. These significant results suggest that youth who experienced more childhood maltreatment reported lower levels of emotional regulation skills than youth who reported less childhood maltreatment, which in turn could partly explain having a lower resilience score, having more psychiatric symptoms, and feeling more distressed following the romantic breakup. Results also indicated that participants who experienced more childhood maltreatment reported lower mentalization skills which in turn could explain why they reported having more psychiatric symptoms.

Moreover, results on the mentalization subscales showed that childhood maltreatment was indirectly associated with all three romantic breakup adjustment measures through self-related mentalization. Self-related mentalization explained 4.8% (resilience), 9.5% (psychiatric symptoms), and 2.6% (distress) of the variance in outcomes. Effect sizes indicated that self-related mentalization carried 6.6% (resilience), 13% (psychiatric symptoms), and 18% (distress) of the childhood maltreatment total effect. This suggests that youth with more childhood maltreatment reported lower levels of self-related mentalization, less resilience, experienced more psychiatric symptoms, and more distress. Results on other subscales of mentalization were not significant. Similarly, all other measures of social cognition did not yield statistically significant coefficients.

4. DISCUSSION

The aims of this study were to investigate whether 1) childhood maltreatment and various aspects of social cognition (emotional regulation, mentalization, and causal attributions) are associated with romantic breakup adjustment in youth (i.e. resilience, psychiatric symptoms, and distress); and whether 2) social cognition mediates the relationship between self-reported exposure to childhood maltreatment and adjustment to romantic breakup.

Our first hypothesis, that childhood maltreatment and social cognition were associated with romantic breakup adjustment in youth, was partially supported by the study's results. As predicted, results revealed that childhood maltreatment was significantly associated with lower levels resilience and higher levels of psychiatric symptoms and distress (path c in figure 1) when mediators were not included in the model. Childhood maltreatment was more strongly associated with resilience than with psychiatric symptoms and, a weaker effect on distress. Experiencing more childhood maltreatment was associated with less resilience, more psychiatric symptoms, and more distress following the romantic breakup. Since questions about resilience were global and not ask about a specific moment while psychiatric symptoms were ask for the last 7 days and distress was asked for the present moment, it's possible that childhood maltreatment has a bigger impact on global adjustment to breakup than adjustment in the present moment. However, these results are consistent with the literature showing the role of childhood maltreatment on adjustment to adversities such as a romantic breakup (Chung & Hunt, 2014; Studley & Chung, 2015; Whisman, 2006). Moreover, childhood maltreatment was still associated with romantic breakup adjustment when the mediators were considered in the model (path c' in figure 1). This shows the important role of childhood maltreatment on adjustment to

romantic breakup. However, effect sizes decreased in path c, indicating the impact of the mediators on the relationship.

Contrary to what we predicted regarding social cognition, only emotional regulation, mentalization, and personal level of control were associated with romantic breakup adjustment in youth (path b in figure 1). More specifically, emotional regulation predicted resilience, psychiatric symptoms, and distress. Participants with higher emotional regulation skills were more resilient, had less psychiatric symptoms, and experienced less distress. In contrast, mentalization and personal level of control were only associated with resilience and psychiatric symptoms, but not distress, following the romantic breakup. Perception of the cause as uncontrollable by oneself predicted more resilience and less psychiatric symptoms. Results on distress might be explained by the fact that measures of resilience and psychiatric symptoms are more global than the measure of distress that is based on the distress experienced now. Results on resilience and psychiatric symptoms are consistent with what has been found in the literature (Belvederi Murri et al., 2017; Stein, 2006), with higher levels of mentalization predicting more resilience and less psychiatric symptoms following the romantic breakup.

As predicted by the second hypothesis, emotional regulation explained part of the childhood maltreatment effect on all three measures of romantic breakup adjustment in youth. Thus, emotional regulation appears to act as a mediator between childhood maltreatment and these outcomes. Indeed, youth exposed to more childhood maltreatment had lower emotional regulation scores, which in turn explained their lower resilience scores, more elevated psychiatric symptoms scores, and lower distress scores (low scores = more distress, see description of the measure). These results are in line with previous studies showing a detrimental impact of emotional dysregulation on adaptation in many contexts such as romantic relationship (Berking & Wupperman, 2012; Bradbury & Shaffer,

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2012; Kim, Pears, Capaldi, & Owen, 2009; Troy & Mauss, 2011). Interestingly, a study showed that emotional regulation acts as a mediator between history of trauma and borderline personality symptoms (Gaher, Hofman, Simons, & Hunsaker, 2013). It is possible that in the current study, participants who experienced childhood maltreatment had emotional regulation difficulties and borderline personality symptoms. Borderline personality symptoms could as well explain difficulties following a romantic breakup.

Moreover, results revealed that when using the overall score of mentalization, mentalization acted as a mediator between childhood maltreatment and only one of the three measures of romantic breakup adjustment in youth. Indeed, mentalization acted as a mediator between childhood maltreatment and psychiatric symptoms following the romantic breakup, while no indirect effect was found for childhood maltreatment and resilience, and childhood maltreatment and distress. This means that youth exposed to more childhood maltreatment had lower mentalization scores, which in turn predicted more elevated psychiatric symptoms scores. However, one of the subscales of mentalization acted as a mediator between childhood maltreatment and all outcomes of interest. Indeed, youth with more childhood maltreatment reported lower levels of self-related mentalization, which in turn explained why they reported being less resilient, and experienced more psychiatric symptoms and distress. These results suggest that being able to understand your own feelings and cognitions has a key role in romantic breakup adjustment. These findings are consistent with existing literature showing the negative effect of childhood maltreatment on mentalization and the positive role of mentalization in romantic relationships (Belvederi Murri et al., 2017; Fonagy et al., 2006; Stein, 2006; Thomas & Fletcher, 2003). Interestingly, effect sizes revealed that emotional regulation carried more of the childhood maltreatment total effect than self-related mentalization, which indicated that emotional regulation played a bigger role in the model. This makes

sense with literature about emotional intelligence saying that being able to recognize your own emotions (a component of self-related mentalization) is a necessary precursor of emotional regulation (Izard, 2001; Lane, 2000; Mayer, Salovey, Caruso & Sitarenios, 2001). In the current study, it's possible to think that self-related mentalization is a necessary component to good emotional regulation and therefore emotional regulation would have a bigger role in the model.

Contrary to the study's hypothesis, causal attributions for the romantic breakup, i.e. locus of causality, stability, external level of control, and personal level of control, were not associated with romantic breakup adjustment (path b in figure 1). Also, locus of causality, stability, external level of control, and personal level of control failed to mediate the relationship between childhood maltreatment and romantic breakup adjustment, with no significant indirect effect. Others-related mentalization and motivation to mentalize also did not mediate the relationship between childhood maltreatment and adjustment following the romantic breakup.

5. LIMITATIONS AND RECOMMENDATIONS

Our results on causal attributions are surprising and might be partly explained by differences in the type of childhood maltreatment experienced. For example, a review of the literature found that there was a significant association between history of emotional maltreatment and negative cognitive style (an internal, stable, global attributional style for negative events) (Gibbs, 2002). In contrast, another study found that youth who experienced childhood sexual abuse reported more external attributions (perpetrator-blame) than internal (self-blame) (Feiring & Cleland, 2007). With regard to our study's results, we did not assess types of maltreatment - it may be that a specific type of causal attribution acts as a mediator between a specific type of childhood maltreatment and

adjustment to romantic breakup. Future studies should aim at distinguishing between types of childhood maltreatment for follow-up analyses. Results can also be partly explained by the characteristics of the sample (gender, non-clinical population, etc.). More precisely, important differences exist between men and women in terms of mentalization styles. In fact, in clinical samples, women have greater abilities in self-related and others-related mentalization than men (Abu-Akel & Bo, 2013). With respect to our own results, perhaps if we had divided the sample by gender, others-related mentalization might have had an indirect effect on the relationship between childhood maltreatment and adaptation to romantic breakup either in women or in a clinical sample. Therefore, findings need to be replicated in various populations.

Furthermore, the current study used a cross-sectional design and as a result, the direction of effect between variables cannot be determined. This is particularly true for social cognition and romantic breakup adjustment outcomes. Future research should attempt to replicate these results using a longitudinal design to get a better understanding of the direction of the effects. In addition, although the age range is restricted (18–25 years), there may be developmental differences in social cognition and effects of a romantic breakup. Thus, future studies should use larger age ranges to determine whether developmental differences affect social cognition and romantic breakup adjustment. Moreover, no information was collected about the characteristics of the relationship and the context of the romantic breakup. A more complex mediational model, in which the characteristics of the relationship and the context of the breakup would be integrated, could enrich the results obtained in the current study. Finally, results on the measure of distress might have been influenced by events not linked to the romantic breakup or by the current mood of the person. Also, only one item was used to measure distress. Future studies should use several items concerning the romantic breakup itself.

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Few studies have attempted to identify possible predictors of romantic relationship breakup while including many aspects of social cognition, as we have done. Moreover, no research has focused on the mediating role of social cognition. Yet, poor social cognition has repeatedly been linked to troubling behaviors including impulsivity, social isolation, and bullying (Sutton, 2003). The current study provides a better understanding of the factors leading to difficulties following a romantic breakup in youth who experienced childhood maltreatment. Although further studies on the role of social cognition in the relationship between childhood maltreatment and romantic breakup adjustment are needed, results show the important role of emotional regulation and self-related mentalization in romantic breakup adjustment in youth who experienced childhood maltreatment. Several other studies would be needed to determine whether interventions aimed at improving emotional regulation skills and mentalization skills would be relevant to youth with history childhood maltreatment who just experienced a romantic breakup.

So far, emotional regulation therapies proved their efficacy for childhood depression (Kovacs et al., 2006), general anxiety disorder (Mennin, Fresco, Ritter, & Heimberg, 2015), bulimia nervosa (Fagundo et al., 2013) and other psychological disorders. As for mentalization therapies, they have demonstrated their effectiveness in individuals diagnosed with borderline personality disorders, particularly concerning suicidal behaviours, diagnostic status, service use, use of medication, global function, and vocational status (Bateman & Fonagy, 2008). More studies are needed to evaluate the effectiveness of these types of intervention on resilience to life stresses, such as romantic break-ups, in young people who experienced childhood maltreatment.

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Annexe 1
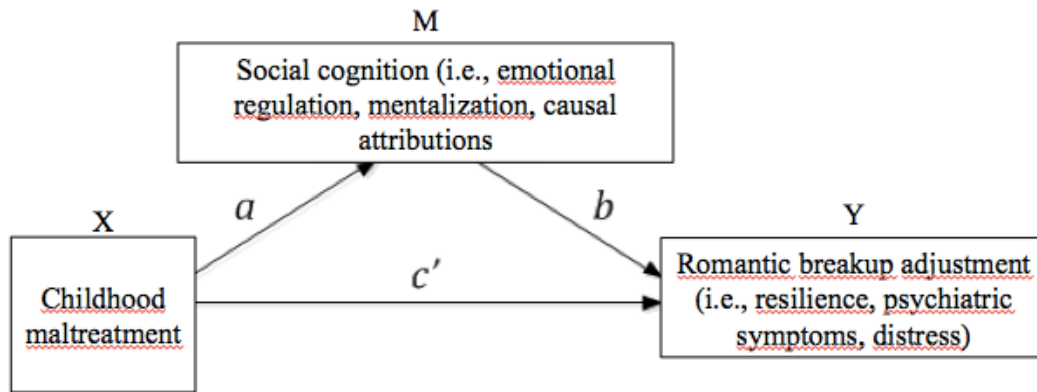
Figure 1: Statistical diagram of the mediation analyses adapted from model 4 in process templates (Hayes, 2013). Note: indirect/mediating effect of childhood maltreatment on romantic breakup adjustment through social cognition (*path ab*); direct effect of childhood maltreatment on romantic breakup adjustment when controlling for social cognition (*path c'*); total effect of childhood maltreatment on romantic breakup adjustment (not shown: *path c = c' + ab*).

Annexe 2

Table I: Effect coefficient, regression coefficient, p value and effect sizes (R^2) for the total effect (*path c*) and direct effect (*path c'*) of childhood maltreatment on romantic breakup adjustment outcomes.

Paths	Resilience				Psychiatric symptoms				Distress			
	EC	*R*	*p* value	ES	EC	*R*	p value	ES	EC	*R*	*p* value	ES
Path c	-.59	-.57	$p < .001$	.32	.56	.43	$p < .001$	.18	-1.00	-.22	$p < .001$	.05
Path c'	-.50	-.48	$p < .001$	.23	.43	.33	$p < .001$	.11	-.51	-.11	$p = .019$	.01

Note: *EC* effect coefficient, *R* regression coefficient, *ES* effect size (R^2)

Annexe 3

Table II: Effect coefficients, bias-corrected bootstrap confidence intervals, and estimated effect sizes (ratio of indirect to total effect) for the indirect effects of childhood maltreatment via social cognition (i.e., emotional regulation, mentalization, causal attributions) on romantic breakup adjustment (i.e., resilience, psychiatric symptoms, distress)

Dependent variables	Resilience			Psychiatric symptoms			Distress		
Mediators	EC	95 % CI LL-UL	ES	EC	95 % CI LL-UL	ES	EC	95 % CI LL-UL	ES
Emotional regulation	-.06	[-.10, -.03]	.11	.11	[.05, .16]	.20	-.50	[-.76, -.25]	.50
Mentalization	-.03	[-.06, .00]	.05	.02	[.00, .04]	.04	.00	[-.05, .06]	.00
Motivation to mentalize	-.01	[-.04, .02]	.01	.00	[-.01, .02]	.01	-.01	[-.05, .03]	.01
Others-related mentalization	-.01	[-.05, .02]	.03	.00	[-.01, .02]	.01	-.01	[-.06, .02]	.02
Self-related mentalization	-.04	[-.06, -.01]	.07	.06	[.02, .10]	.13	-.12	[-.24, -.03]	.18
Locus of causality	.00	[-.01, .01]	.00	.00	[-.02, .01]	.00	.00	[-.75, -.23]	-.01
Stability	.00	[-.00, .01]	-.01	.00	[-.02, .01]	-.01	.01	[-.05, .06]	-.02
External control	.00	[-.01, .00]	.00	.00	[-.01, .02]	.01	.00	[-.03, .04]	.00
Personal control	.00	[-.02, .01]	-.01	.01	[-.02, .03]	.01	-.01	[-.76, .04]	.02

Note: *EC* effect coefficient, *CI* confidence interval based on 10,000 bootstrap samples, *LL* lower level, *UL* upper level, *ES* effect size based on the ratio of indirect to total effect of childhood maltreatment on dependent variables.

Annexe 4

Question concernant la détresse :

Comment te sens-tu présentement?

Ça ne va pas du tout   Je me sens super bien
  0   1   2   3   4   5   6   7   8   9   10