

Developmental Timing of Trauma and Rejection Sensitivity

**Jenelle A. Richards, McNair Scholar
The Pennsylvania State University**

**McNair Faculty Research Advisor:
Amy D. Marshall, Ph.D.
Associate Professor of Psychology
Department of Psychology
College of Liberal Arts
The Pennsylvania State University**

Abstract

Trauma exposure at different times during development may create different effects on psychopathology and social functioning. Rejection sensitivity, or the expectation of rejection in various social settings, is a construct not heavily researched, but is vital to interpersonal relationships. To test the relationship between developmental timing of trauma exposure and rejection sensitivity, Penn State students in introductory psychology courses completed an online survey in exchange for class credit. This survey contains detailed questions regarding potentially traumatic events participants may have experienced as well as a questionnaire about their tendencies to expect rejection in social situations. We hypothesized that trauma exposure during puberty, when brain functions designed for navigating social relationships are developing most, will most strongly predict later rejection sensitivity. Results of multiple regression analyses and bivariate correlation tests support this hypothesis, indicating that a significant and unique relationship exists between rejection sensitivity and trauma exposure during puberty.

Introduction

A potentially traumatic event (PTE) is defined as actual or threatened death that an individual directly experienced once or repeatedly, witnessed, or learned second-hand about a close family member or friend, with the actual or threatened death being either violent or accidental (American Psychiatric Association, 2013). Such events have been experienced by roughly 82.7% of the adult United States population (Liu et al., 2017). A majority of adolescents in the United States, 61.8%, have experienced at least one PTE with the most commonly reported being an unexpected death of a loved one (McLaughlin et al., 2013). Additionally, studies show that an average of 85% of undergraduate students have experienced a PTE at some point in their life, most common also being unexpected death of a loved one (Frazier et al., 2009). This rate is similar to that of adults across the lifespan, potentially due to the high prevalence of interpersonal trauma in early adulthood (including sexual assault on college campuses; McLaughlin et al., 2013) and/or younger adults may have enhanced perception and memory for potentially traumatic events.

Mental health disorders, such as posttraumatic stress disorder (PTSD) and depression, are among the most commonly discussed consequences of experiencing a trauma (Kessler, 2000). Collectively, people who have experienced a PTE have lower self-esteem (Smith, 2016), which

may suggest a higher susceptibility to comorbid mental disorders, or it can also suggest decreased self-esteem being a consequence of having such disorders. Overall global distress also tends to be higher in people diagnosed with PTSD (Taft, 2011). Like low self-esteem, feelings of shame and guilt are also associated with potentially traumatic events and can cause more psychological damage to the victims (DeCou, 2017). It is also important to recognize that adolescents who have experienced a PTE, especially women or adolescents with pre-existing fear or distress disorders or previous PTE exposure, are at a higher risk of being diagnosed with PTSD, with one-third being predicted to not recover (McLaughlin et al., 2013). Other consequences of trauma can include increased suicide rates, 150% elevated odds of unemployment, work impairment (averaging almost 4 fewer completed work days per month) causing decreased average income, and a 60% higher chance of marriage instability (Kessler, 2000). Indeed, posttraumatic stress disorder is also associated with more physical and psychological aggression perpetration in intimate relationships (Taft, 2011).

All of these consequences of PTE exposure are highly intertwined with social functioning issues. For example, higher psychological aggression perpetration associated with PTE exposure may explain marriage instability. Rejection sensitivity is the expectation of rejection across various social contexts, such as with peers, family, or others. Rejection sensitivity is vital in social interactions and it is associated with higher anxiety and worry, as well as lower self-esteem (Feldman and Downey, 1994). Higher rejection sensitivity is also associated with avoidant and ambivalent adult attachment styles (Feldman and Downey, 1994) and more relationship conflicts overall (Downey, Freitas, Michaelis, and Khouri, 1998). Avoidant and ambivalent attachment styles are associated with lower self-esteem and increased anxiety and worry as well. Attachment styles can change based on events that occur, like trauma, and can become insecure (Feldman and Downey, 1994). This can indicate that rejection sensitivity can also change after exposure to a trauma. Understanding rejection sensitivity more thoroughly can be a key factor in more fully comprehending trauma's impact on social functioning.

Some research suggests a sensitive period during puberty exists and has a direct influence over social constructs like rejection sensitivity. Research indicates that trauma exposure during puberty increases susceptibility to the development of anxiety disorders (particularly social phobia), potentially due to the increase of hormones in the body, neuroplasticity, and neural development during puberty (Marshall, 2016). In such a sensitive period, it is suggested that a trauma's impact on a breadth of social constructs will be greater than trauma during other periods in development (Holder and Blaustein, 2014; Marshall, 2016; Lupien, McEwen, Gunnar, and Heim, 2009). Rodents that experience a PTE of being transported across country to labs during puberty are more likely to express depression-like behaviors and a decrease in hormone production compared to mice transported during any other developmental period (Holder and Blaustein, 2014). This suggests that trauma during puberty "remodels" the brain as a response, potentially resulting in a higher vulnerability to mental health disorders and associated difficulties (Holder and Blaustein, 2014). Rejection sensitivity is one of the lesser studied social concepts, but it is important to study in order to fully understand the effect trauma has on interpersonal relationships and social cognition. Research has shown that adolescents use their dorsomedial prefrontal cortex (dmPFC) more often than adults when completing a task in which social cues are needed (Blakemore and Mills, 2014). This has been interpreted to mean that, in social and emotional conditions, adolescents use brain regions involved in understanding mentalization, even when it is unnecessary (Blakemore and Mills, 2014). This demonstrates that

social components, such as rejection, are processed differently during puberty, increasing the sensitivity during this time (Blakemore and Mills, 2014).

The current study is designed to determine if there is a relationship between the time during development at which a PTE exposure occurs and a difference in rejection sensitivity in early adulthood. We hypothesize that trauma exposure during puberty, the time when the neuroplasticity and neural development related to social cognition and processes is increased, will be uniquely associated with the most severe and negative impact on individuals' sensitivity to potential rejection.

Methods

Participants:

Participants included 30 students enrolled in an introductory Psychology course at The Pennsylvania State University during the summer of 2017; 3 did not complete all measures. Age of participants ranged from 18 to 37 years, with a mean of 24 ($SD = 5.75$). The majority (85.7%) of participants who completed this study were female. Twenty-two (78.6%) participants were White, three (10.7%) were Asian, two (7.1%) were more than one race, and one (3.6%) was African American. All participants had at least a high school education, with the highest being 18 years of education ($M = 12.52$, $SD = 6.25$). Eight participants reported having children, ranging from 1 to 4. Most (63%) participants stated they are currently in a relationship, defined as “dating or committed intimate relationship, whether or not sexual intimacy occurs.”

Procedure:

This study contained an online series of questionnaires. Participants signed up to take this survey in exchange for partial course credit. Participants completed the survey at their convenience. The full survey, including measures not contained in the current report, took participants anywhere from 45 minutes to 6 hours to fully complete.

Measures:

Traumatic Life Events Questionnaire (TLEQ): The TLEQ is a 24-question survey used to identify 22 life events that are considered potential traumatic events based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria for stressors that may lead to PTSD (Kubany et al., 2000). A 1-week test-retest analysis shows Kappa coefficients that were .60 or higher for 8 of the 16 items, and .40 or higher for 14 of the 16 items (Kubany et al., 2000). The overall average for test-retest agreements was 88% (Kubany et al., 2000). This questionnaire was adapted for computer usage and to assess the age at each occurrence, to align with the number of times each event happened. Although the experience of fear, helplessness, or horror is assessed in the original TLEQ in order to align with DSM-IV criteria, we excluded such questions in order to align with DSM5 criteria. Participants also did not report if they were seriously injured, if the event was caused by more than one person, or details regarding assaults.

Rejection sensitivity questionnaire (RSQ): The RSQ includes 9 hypothetical scenarios and two questions per scenario answered using a 6-point Likert scale measuring 1) the amount of concern or anxiety participants would experience in response to each given situation, and 2) the expectation of rejection in response to the same event (Downey, Freitas, Michaelis, & Khouri, 1998). An example scenario includes, “You bring up the issue of sexual protection with your significant other and tell him/her how important you think it is.” Participants are then asked, “How concerned or anxious would you be over his/her reaction?” and can respond with a 6-point Likert scale ranging from 1 (“very unconcerned,”) to 6 (“very concerned.”) Regarding the same scenario, participants are then asked another 6-point Likert scale question addressing their expectation of rejection, “I would expect that he/she would be willing to discuss our possible options without getting defensive,” with 1 indicating “very unlikely” and 6 indicating “very likely.” Test-retest reliability was .83 over a 2-3 week period and .78 over a 4-month period (Downey et al., 1998). For the purpose of this study, these questions were adapted for computer usage. To calculate total rejection sensitivity scores, items regarding expectation of rejection were reversed scored to allow higher scores to indicate higher rejection expectation, then multiplied by scores given for anxiety/concern. These scores for all scenarios were summed, then divided by number of scenarios, as described by Downey et al. (1998).

Statistical analyses:

Data on participants’ earliest experiences of trauma were structured such that participants received 4 continuous scores representing the number of traumas experienced during the following: 3 to 5 years after birth (“infancy-preschool”), 2 to 6 years before the puberty period (“grade school”), 3 years before and the last year of puberty, based on age of menarche for women and the last reported age of any pubertal process (i.e., voice changes, body hair growth, skin changes) for men (“puberty”), and 1 year after reported age of puberty to present day (“postpuberty”). The number of years included in the infancy-preschool and grade school periods varied because of the variability in number of years for birth to puberty, as indicated in Table 1. Although both girls and boys typically complete puberty within 4 years, this timespan for puberty was used conservatively to ensure full coverage of adrenarche and spermatarche.

Descriptive statistics, bivariate correlations, and multiple regression analyses were conducted to test for a relationship between trauma exposure during the developmental periods and scores on the RSQ. Regression models were adjusted for current age to minimize bias due to a possible relationship between recency of trauma and rejection sensitivity. Models were also adjusted for participants’ age at the end of puberty to minimize bias due to the following: differing number of years included in the infancy-preschool and grade school periods; possible relationships between trauma exposures or other forms of adversity and pubertal timing; and possible increased sensitivity to the effects of trauma among early maturers.

Table 1: Ages Included in Each Developmental Period Based on Age of Last Year of Puberty

	9y	10y	11y	12y	13y	14y	15y	16y	Years, Mean	Rate of Trauma % (n)	No. of Traumas Mean (SD)
Infancy	0-3	0-3	0-3	0-4	0-4	0-4	0-5	0-5	4.8	18.5% (27)	0.1121 (0.364)
Grade school	4-5	4-6	4-7	5-8	5-9	5-10	5-10	5-11	4.6	48.1% (27)	0.3947 (0.740)
Puberty	6-9	7-10	8-11	9-12	10-13	11-14	12-15	13-16	4	55.6% (27)	0.5325 (0.988)
Postpuberty	10+	11+	12+	13+	14+	15+	16+	17+	12	96.3% (27)	0.7703 (0.987)

Results

Of the 27 participants who fully completed the survey, 100% experienced at least one potentially traumatic event in their lifetimes. The most commonly reported PTEs were “sudden/unexpected death of a close friend or loved one” and “seeing or hearing family violence” with a prevalence of 55.6% and 29.6% respectively. Trauma exposure rates increased across developmental periods, most notably from infancy (18.5%) to grade school (48.1%) and from puberty (55.6%) to postpuberty (96.3%), as shown in Figure 1. Broken down further by age as a continuous score, frequency of PTE exposure peaks at two age periods: the typical ages of puberty (9-14 years) and late adolescence (15-18 years), as shown in Figure 2.

The average score on the Rejection Sensitivity Questionnaire (RSQ) was 10.33 ($SD = 4.64$), with a range from 3.33 to 20.67. Scores above the median RSQ score (10.05) were consider “high,” indicating high rejection sensitivity, and scores below the median were considered low in rejection sensitivity. In infancy, the average number of traumas experienced was .1121 ($SD = .36$) and ranged from 0 to 1.85. Participants experienced an average of .3947 ($SD = .74$) traumas in the grade school developmental period, ranging from 0 to 3.17. The number of traumas during puberty ranged from 0 to 4.50, with a mean of .533 ($SD = .99$). The number of traumas participants experienced during the postpuberty stage ranged from 0 to 4.79 and averaged .77 ($SD = .99$).

Figure 1

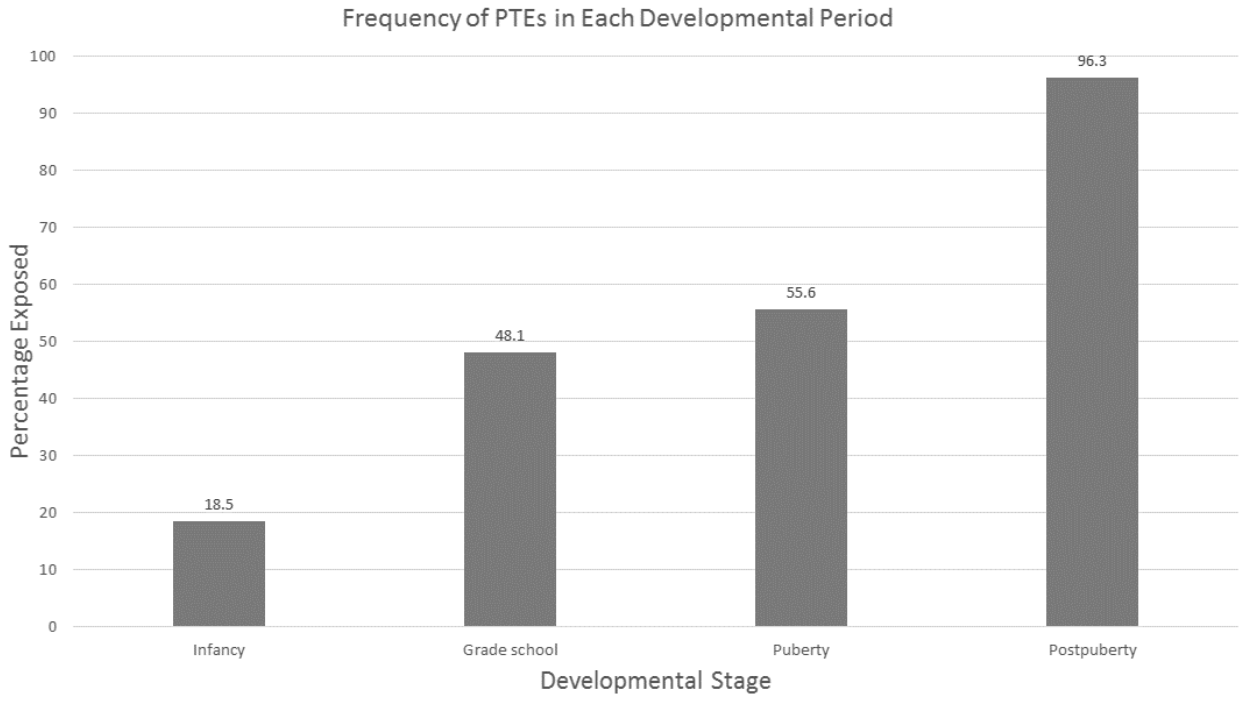
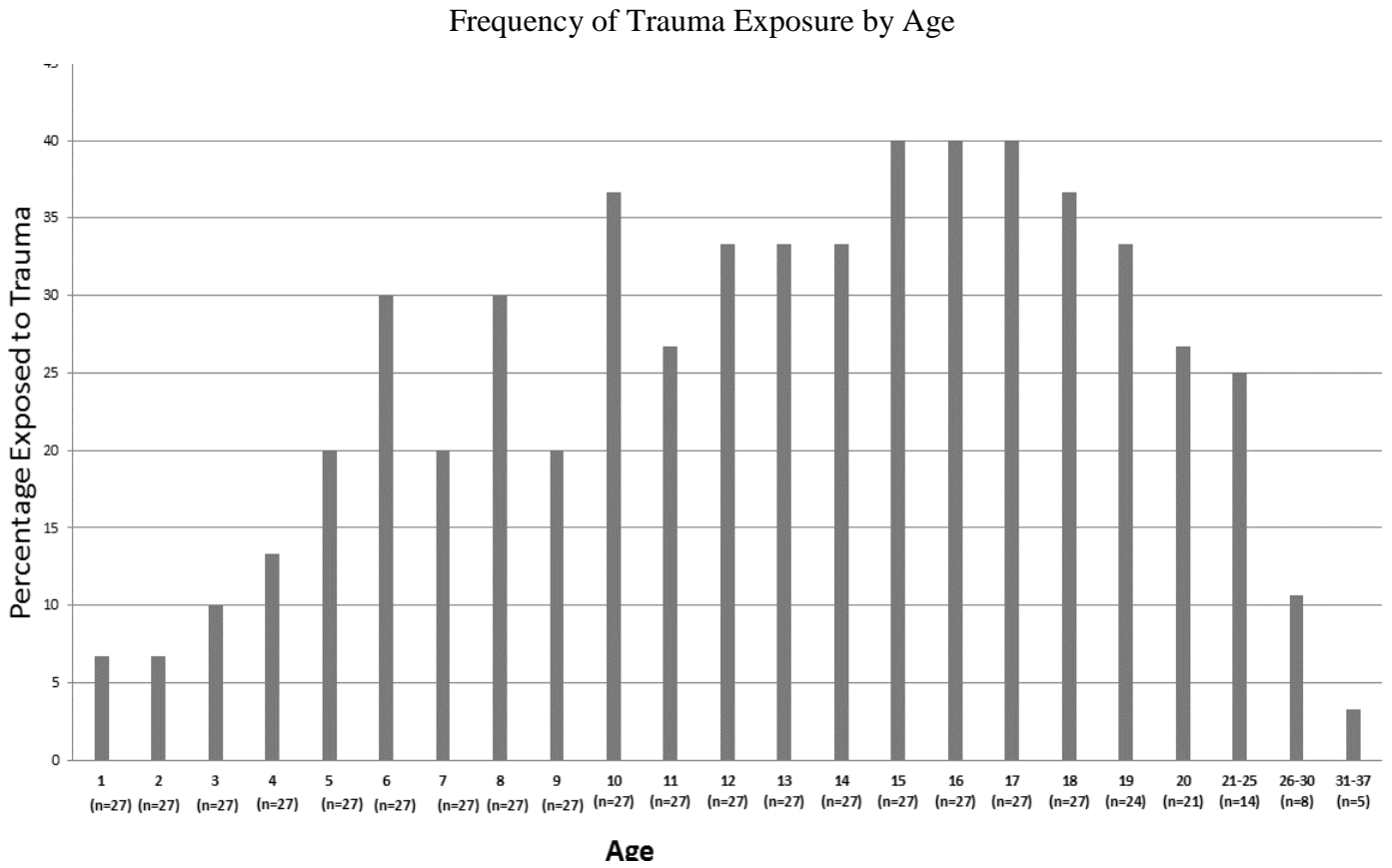


Figure 2



Bivariate correlations between each developmental period's continuous trauma exposure scores and the RSQ indicated that only one statistically significant relationship occurred. Specifically, the number of potentially traumatic events experienced during puberty was positively correlated with the RSQ total score ($r = .40, p = .040$). A moderate ($r = .34$), but statistically nonsignificant ($p = .079$) relationship was found between the number of potentially traumatic events experienced during grade school and RSQ scores. All correlations are reported in Table 2.

Table 2

Developmental Period	Pearson Correlation to RSQ score	Significance of Correlation between RSQ score and Developmental Period
Infancy	.230	.247
Grade School	.344	.079
Puberty	.398*	.040
Postpuberty	.085	.674

When running a multiple regression analysis to simultaneously examine the predictive values of trauma exposure during each developmental period while controlling for current age and age at the end of puberty, trauma during puberty significantly and uniquely predicted rejection sensitivity in adulthood. These results are displayed in Table 3. Trauma exposure accounted for a substantial amount of the variance in rejection sensitivity (24%). The pattern of results remained the same when using dichotomous scores representing the presence or absence of trauma exposure during each developmental period to predict rejection sensitivity.

Table 3

	Unstandardized <i>B</i>	Standard Error	Standardized Beta	<i>t</i>	Sig.
Infancy	-6.077	4.006	-0.512	-1.517	0.150
Grade school	4.058	2.893	0.460	1.403	0.181
Puberty	5.445	2.356	0.742	2.311	0.035
Postpuberty	-2.496	2.028	-0.292	-1.230	0.237

Discussion

Trauma is an occurrence that can happen to anyone at any time and is difficult to prevent entirely. Fully comprehending the effects of a potentially traumatic event as well as why and how it impacts victims can contribute to the treatment of associated consequences such as psychopathology, economic difficulties, and interpersonal relationship problems (Kessler, 2000; Taft, 2011; Feldman and Downey, 1994). Research on rejection sensitivity, in particular, is vital to understanding the workings of relationships with anyone from family to significant others to coworkers. It is especially important to study how this sensitivity may change in accordance to trauma exposure, as well as when the brain is most susceptible to these changes in rejection sensitivity. Studies show this is a consequence of trauma exposure due to sensitive periods in the brain during various times of development (i.e., puberty and social cognition and functioning; Holder and Blaustein, 2014).

Results of the current study indicate that 100% of participants experienced at least one traumatic event in their lifetimes. Although this prevalence rate is higher than both adult and college student averages in the United States (Liu et al., 2017; Frazier et al., 2009), it magnifies the crisis that is trauma exposure and demonstrates that it needs to be researched as thoroughly as possible. The peak in frequency of trauma exposure that occurs in late adolescence also shows the importance of researching this particular age demographic: college-aged students. Because the likelihood that a person experienced a PTE is highest right before entering college, looking into the effects of this age cohort will give the best results on the effects because the experience occurred so recently. Discovering PTE exposure more recently in relation to the event can also cause earlier detection of psychological damage, like PTSD, leading to earlier treatment and potentially more successful outcomes.

Bivariate correlations and, more notably, multiple regression analyses indicate a significant relationship between trauma experienced during puberty and rejection sensitivity, as hypothesized. This supports Holder and Blaustein's (2014) research that social cognition and related social processes are more susceptible to injury, such as that imposed by trauma exposure, during puberty than other developmental periods. This may be a consequence of the increased neuroplasticity in particular areas of the brain during this time. Results also showed a moderately significant relationship during grade school, but this effect was no longer present to a substantial degree when simultaneously considering the impact of trauma exposure during puberty. Further research is needed to fully comprehend trauma exposure's impact across developmental periods on rejection sensitivity.

In order to research this further, a larger sample size would be required. It is important to recognize that a small sample size is problematic because, although the regression results were significant, it is uncertain if the results are a function of the small sample or if they can be generalized to a larger population. Gender differences are also unable to be accounted for due to the small number of men included in the sample. However, these preliminary findings demonstrate that some relationship occurs between the two variables, and should continue being researched to entirely comprehend. This research will be continuing at The Pennsylvania State University during the fall 2017 semester, when a greater and more diverse sample is anticipated to partake in the research.

While preliminary findings of this study indicate an unmistakable need for further research, there are additional limitations of this study. Because this survey was self-report, there can be

issues with reporting. When asked to recall the age at which an event occurred, participants may have guessed an age that is not accurate, causing an unintentional error in developmental period trauma frequencies. There is also an issue with disclosing personal information, which can cause participants to not be honest when completing the survey. Solutions could have included using interviews to help participants think through ages, having parents report on ages of experiences, or the use of clinical techniques to decrease impression management. However, accounting for error by adjusting developmental periods and allowing participants to remain anonymous and complete this survey in the privacy of their homes likely lessened these errors.

While PTE exposure is generally not avoidable, the consequences can be lessened if fully understood. Interventions and research focused on identifying and treating trauma exposure during puberty is necessary based on previous literature indicating the presence of a sensitive period during puberty in regards to injury and social functioning. If puberty serves as a sensitive period for the development of rejection sensitivity, it may be that interventions provided during puberty can be especially effective in this regard. Research conducted on various effects of trauma, like rejection sensitivity, is crucial in grasping the trauma's impact on victims. Said research on these constructs is not complete, and should be continued as thoroughly as possible.

References

- Blakemore S.-J., and Mills K.L.: Is adolescence a sensitive period for sociocultural processing? *Annu Rev Psychol* 2014; 65: pp. 187-207
- DeCou C.R., Cole T.T., Lynch S.M., and Wong M.M.: Assault-related shame mediates the association between negative social reactions to disclosure of sexual assault and psychological distress. *Psychological Trauma: Theory, Research, Practice, and Policy* 2017; 9: pp. 166-172
- Downey G., Freitas A.L., Michaelis B., and Khouri H.: The self-fulfilling prophecy in close relationships: Rejection sensitivity and rejection by romantic partners. *Journal of Personality and Social Psychology* 1998; 75: pp. 545-560
- Feldman S., and Downey G.: Rejection sensitivity as a mediator of the impact of childhood exposure to family violence on adult attachment behavior. *Development and Psychopathology* 1994; 6: pp. 231-247
- Frazier P., Anders S., Perera S., Tomich P., and Tennen H.: Traumatic events among undergraduate students: Prevalence and associated symptoms. *Journal of Counseling Psychology* 2009; 56: pp. 450-460
- Holder M.K., and Blaustein J.D.: Puberty and adolescence as a time of vulnerability to stressors that alter neurobehavioral processes. *Frontiers in Neuroendocrinology* 2014; 35: pp. 89-110
- Kessler R.C.: Posttraumatic stress disorder: The burden to the individual and society. *Journal of Clinical Psychiatry* 2000; 61: pp. 4-12
- Kubany E.S., Haynes S.N., Leisen M.B., Owens J.A., Kaplan A.S., Watson S.B., and Burns K.: Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The traumatic life events questionnaire. *Psychological Assessment* 2000; 12: pp. 210-224

- Liu H., Petukhova M.V., Sampson N.A., et al.: Association of DSM-IV posttraumatic stress disorder with traumatic experience type and history in the world health organization world mental health surveys. *JAMA Psychiatry* 2017; 74: 270-281
- Lupien S.J., McEwen B.S., Gunnar M.R., and Heim C.: Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience* 2009; 10: pp. 434-445
- Marshall A.D.: Developmental timing of trauma exposure relative to puberty and the nature of psychopathology among adolescent girls. *Journal of the American Academy of Child and Adolescent Psychiatry* 2016; 55: pp. 25-32
- McLaughlin K.A., Koenen K.C., Hill E.D., et al: Trauma exposure and posttraumatic stress disorder in a national sample of adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 2013; 52: pp. 815-830
- Smith C.P., Cunningham S.A. and Freyd J.J.: Sexual violence, institutional betrayal, and psychological outcomes for LGB college students. *Translational Issues in Psychological Science* 2016; 2: pp. 351-360
- Taft C.T., Watkins L.E., Stafford J., and Street A.E.: Posttraumatic stress disorder and intimate relationship problems: A meta-analysis. *Journal of Consulting and Clinical Psychology* 2011; 79: pp 22-33