Abstract

This study assessed the relationships between psychopathic personality traits and perceived stress amongst 264 young adults. A hypothesised mediation role for emotion and empathy deficits in the psychopathy-stress association was also investigated. Results indicated stronger associations between perceived stress with secondary psychopathy compared with primary psychopathy. Partial mediation effects of alexithymic traits on the relationship between stress and psychopathic personality traits are reported. Although the current study showed that both primary and secondary traits are significantly association with higher levels of self-reported stress, it is the latter which seems to be most important, lending more weight to the need to consider mental health outcomes in those with high levels of secondary psychopathy characteristics.

*Keywords***:** Stress (behavioural); primary psychopathy; secondary psychopathy; emotional difficulties (alexithymia).

Understanding the psychopathy-stress association in typical developing adults: the role of emotional deficits

The common lay concept of psychopathy is one of coolness and control. However, the empirically-derived profile of psychopathic behavior includes indications of higher stress reactivity, irritability and anger (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Cleckley, 1941/1976; Patrick, 2018). Such emotion-regulation difficulties may underpin the proactive and reactive types of aggression observed (Cima & Raine, 2009).

Emotional distress is both an antecedent and consequence of antisocial behaviour (Deschamps, Verhulp, de Castro, & Matthys, 2018; Garofalo, Neumann, & Velotti, 2018). High scores on psychopathy measures, along with elevated self-reported perceived stress, have been found to predict concomitant violence offending and victimisation (Silver et al., 2011). Although experimental evidence showing lower autonomic nervous system activation in stress reactivity and in stress recovery in psychopathic samples have been replicated (e.g., Beauchaine, Gatzke-Kopp, & Mead, 2007; Nederhof, Marceau, Shirtcliff, Hastings, & Oldehinkel, 2015; Sijtsema, Van Roon, Groot, & Riese, 2015), few studies have investigated the associations between psychopathy and perceptions of stress.

However, before we consider what we already know about psychopathy and stress, it is important to consider work on primary and secondary variants of psychopathy. First proposed by Karpman (1941), these variants are typically defined as being characterized by low anxiety/internalizing symptoms in the case of primary psychopathy, and increased anxiety and internalizing symptoms, often seen alongside greater levels of traumatic experiences than those presenting with the primary subtype profile (Skeem et al., 2007; Tatar et al., 2012).

Cross-sectional work that has explored the associations of psychopathic personality traits to post-traumatic stress suggests that affective deficits seen in psychopathy could have

some adaptive role in dealing with stress (Pham, 2012). For this reason, psychopathic personality traits of fearlessness and stress immunity seem to better characterize the primary psychopathy profile rather than the secondary subtype (Marcus, Fulton, & Edens, 2013). Similarly, traits denoting fearlessness have been negatively associated to personal distress, suggesting that amongst this group of individuals with (likely primary-type) higher psychopathic personality traits, there is an attenuated experience of distress (Durand, 2018).

One further study investigating the association between antisocial personality disorder (APSD; which includes those with elevated psychopathic traits) and perceived stress found that those with APSD had higher levels of self-reported stress when compared to participants with antisocial adults, and those without antisocial traits. (Goldstein, Dawson, Smith, & Grant, 2012). Previous work has shown that psychopathy and perceived stress are positive, significant predictors of concomitant violence offending and victimisation (Silver, Piquero, Jennings, Piquero, & Leiber, 2011). In addition, nearly 75% of incarcerated males who scored >27 on the PCL-R reported a history of traumatic stressful events (Pham, 2012). In a further sample of psychiatric patients, Dalkner et al. (2018) employed the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005) along with several measures of stress-related experiences, reporting that low self-reported stress levels and adaptive stress coping strategies might be explained by primary psychopathic personality traits in psychiatric settings. Recent data showed much stronger associations between secondary psychopathy and stress than between primary psychopathy and stress for both male and female participants (Eisenbarth et al., 2019).

One potential mechanism to explain increased stress responses is via impairments or differences in emotion processing. Stressful life events are certainly associated with differences in attention to and memory for emotional stimuli (Demers et al., 2018; Pollack, Cicchetti & Klorman, 1998), and individual differences in stress responses are associated with

differences neural activity in areas of the brain involved in emotion processing (Henckens et al., 2015). At present, it is not clear whether emotional/social information processing deficits offer incremental utility in understanding stress in psychopathy (Crozier et al., 2008; Derefinko, 2015). Among these deficits in emotion processing, alexithymia is a strong candidate for further consideration. Defined as being an inability to describe or recognize one's own emotions, alexithymia has particular potential relevance to the study of psychopathy as both conditions entail deficiencies in empathic response (Bird & Viding, 2014; Takamatsu & Takai, 2017). Alexithymia has been negatively associated with empathic concern, one facet of affective empathy (Bird et al., 2010; Grynberg, Luminet, Corneille, Grezes, & Berthoz, 2010) and positively with psychopathy (Lander, Lutz-Zois, Rye, & Goodnight, 2012; Louth, Hare, & Linden, 1998). Higher scores on alexithymia measurements - especially those denoting deficits in identifying and describing feelings - have been positively linked to experiences of personal distress in adults (Grynberg et al., 2012). It is important to be able to consider the role of being able to adequately recognize and express one's own emotions in the management of stress, and the impact that these factors may have on antisocial behavior.

The current study

Psychopathy is not only linked to significant, direct harm to other individuals but also important societal costs (DeLisi, Reidy, Heirigs, Tostlebe, & Vaughn, 2018). Psychopathy is also associated with poorer outcomes for the individuals themselves, particularly those high on the affective component of the disorder, and is frequently assocaited with high rates of early stressful life experience (Dargis, Newman & Koenigs, 2016; Dhingra, Boduszek, Palmer & Shevin, 2015). There is an emergent interest in studying the role that stress plays in behaviour associated with psychopathy (Durand, 2018; Eisenbarth et al., 2019).

The principal aim of the research was to explore the relationship between primary and secondary psychopathic personality traits and their associations with both alexithymic symptoms and with self-reported stress. Beyond the basic issue of the nature of bivariate relationships between psychopathy and stress, there are three key questions that we sought to investigate:

1. How do primary and secondary variants of psychopathic personality traits relate to alexithymia? Although previous work suggests a relationship between psychopathic traits and alexithymic symptoms, no previous work has attempted to explore whether this association is true for both primary and secondary variants of psychopathic personality traits.

2. Is there a difference in the way that primary and secondary variants of psychopathy relate to self-reports of stress? Based on previous work that used psychophysiological and self-report measures, we aimed to test they hypothesis that perceived stress would positively associate with the secondary variant of psychopathic personality traits, but negatively with the primary variant. .

3. What processes might mediate associations between stress and psychopathy? Arguably, various processes associated with psychopathy might contribute to higher levels of self-reported stress, but mediating mechanisms have been so far neglected in the research reviewed. Given that psychopathic personality traits can be comorbid with alexithymia, it was predicted that alexithymia would be a significant mediator in the relationship between perceived stress and primary and secondary psychopathic personality traits. However, larger effects were expected to occur for the model exploring secondary psychopathic personality traits as a predictor of stress.

Method

Participants, procedures and design

This cross-sectional study involved a convenience sample of 264 adults (M_{age} = 21.7 years, *SD* = 6.92; 70% female). *G**Power (version 3.1.9.2) was used to confirm that for all analyses the number of participants was sufficiently enough for securing 95% of power and α = .05 or less (Faul, Erdfelder, Lang, & Buchner, 2007). Measures were presented after obtaining formal consent from participants, which were recruited on the basis of being aged 18 years-old or more, fluent in English, and regularly enrolled as university students. Prior to completing the measures, participants were informed about their rights as participants and asked to provide active consent. Course credits were granted as a form of retribution for participation.

Materials

Levenson Primary and Secondary Psychopathy Scales (LPSP; Levenson, Kiehl, & Fitzpatrick, 1995). This 26-item questionnaire uses a four-point scale to assess different domains related to psychopathic personality in adults. For primary psychopathy, 16 items measure manipulatives tendencies, lying behaviours, and lack of remorse, while 10 items of secondary psychopathy assess domains such as impulsive behaviour, low tolerance and blame externalisation. In the current study, Cronbach's alphas were adequate (α = .86 for the total scale, α = .84 for primary psychopathy, and α = .70 for secondary psychopathy).

Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994). This is the most widely used measure of alexithymia and items are displayed in a five-point Likert scale ranging from "Strongly disagree" (1) to "Completely agree" (5). Normally, the TAS-20 is divided into a three-factor structure: difficulties identifying feelings (DIF; seven items); difficulties describing feelings (DDF; five items); and externally oriented thinking (EOT; eight items). Cronbach's alpha for the current study were α = .80, .70, .80 and .63 for the global scale, DIF, DDF, and EOT, respectively.

Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). A 10-item measure, arranged on a five-point scale varying from never (0) to very often (4), that requires participants to rate the frequency in which they experienced stressful situations in the past month (Cohen et al., 1983). Research has shown high internal consistency and evidence of predictive and construct validity for the PSS in psychopathy research (Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). In this study the internal consistency was acceptable (α = .86).

Data analysis

To address to the first aim, this study will report on correlations (Pearson) between perceived stress with alexithymia and psychopathy. To account for possible effects of emotional deficits in explaining the links between self-reported stress and psychopathic traits, mediation analyses will be run independently for each psychopathic variant. We used the PROCESS macro by Hayes (2012) which tests for indirect effects by calculating confidence intervals for indirect effects using bootstrapping procedures (5,000 samples).

Results

In respect to the links between alexithymia and primary and secondary psychopathy personality traits, positive, small to moderate correlations were found for Externally Oriented Thinking, Difficulties Identifying Feelings and Difficulties Describing Feelings, although the magnitude of relationship was greater for the secondary psychopathy variant for the latter two dimensions of alexithymic symptoms and for alexithymia total score (Table 1). Even though both associations between primary/secondary variants of psychopathy and self-reported stress were positive and statistically significant, the association between perceived stress with secondary psychopathy was over twice the size of the correlation detected for primary psychopathy.

Table 1
Correlations between dimensions of alexithymia, psychopathy and stress

		1	2	3	4	5	6	7
1. Difficulties in identifying feelings	*r*	-						
2. Difficulties in describing feelings	*r*	.53	-					
	p-value	< .001	-					
	Upper 95% CI	.62	-					
	Lower 95% CI	.43	-					
3. Externally oriented thinking	*r*	.10	.35	-				
	p-value	.14	< .001	-				
	Upper 95% CI	.24	.46	-				
	Lower 95% CI	-.04	.22	-				
4. Alexithymia total	*r*	.74	.84	.64	-			
	p-value	< .001	< .001	< .001	-			
	Upper 95% CI	.80	.87	.71	-			
	Lower 95% CI	.67	.79	.55	-			
5. Primary psychopathy	*r*	.16	.25	.46	.37	-		
	p-value	.02	< .001	< .001	< .001	-		
	Upper 95% CI	.29	.37	.56	.48	-		
	Lower 95% CI	.02	.11	.34	.24	-		
6. Secondary psychopathy	*r*	.36	.43	.30	.48	.54	-	
	p-value	< .001	< .001	< .001	< .001	< .001	-	
	Upper 95% CI	.47	.54	.42	.58	.63	-	
	Lower 95% CI	.23	.31	.17	.36	.43	-	
7. Stress	*r*	.54	.38	.05	.45	.19	.42	-
	p-value	< .001	< .001	.48	< .001	.01	< .001	-
	Upper 95% CI	.63	.49	.19	.55	.32	.53	-
	Lower 95% CI	.44	.25	-.09	.33	.05	.30	-

Subsequently, we tested mediation models examining to what extent the perception of one's own emotional experiences (e.g., alexithymia) explains the relationship between psychopathic variants and stress, addressing the second research question above. Mediation requires that the mediator (alexithymia) predicts the dependent variable (DV; perceived stress). Results were in line with this requirement ($R^2_{Adjusted}$ = .19, β = .44, p < .001). In addition, the independent variables (IV) should also predict the mediator. This assumption was confirmed for primary ($R^2_{Adjusted}$ = .13, β = .37, p < .001) and secondary psychopathy ($R^2_{Adjusted}$ = .22, β = .47, p < .001). Another requirement is that when IV's and the mediator are included together, the relationship between IV and the dependent variable (DV) declines and the variance explained increases (Jose, 2013). This condition was again supported for both models. Beta's value decreased to .02 and $R^2_{Adjusted}$ increased to .19 in the primary psychopathy model (Sobel's z= 4.24, p = .002, with .85 indirect to total ratio effect size; the bootstrapped unstandardized indirect effect was significant and entirely above zero (.15 [95% CI .08 to .24]). For secondary psychopathy, beta decreased to .27, and there was an increase in the variance explained ($R^2_{Adjusted}$ = .25), with .36 indirect to total ratio effect size (Sobel's z= 3.91, p = .009); the bootstrapped unstandardized indirect effect was significant and entirely above zero (.22 [95% CI .11 to .35]).

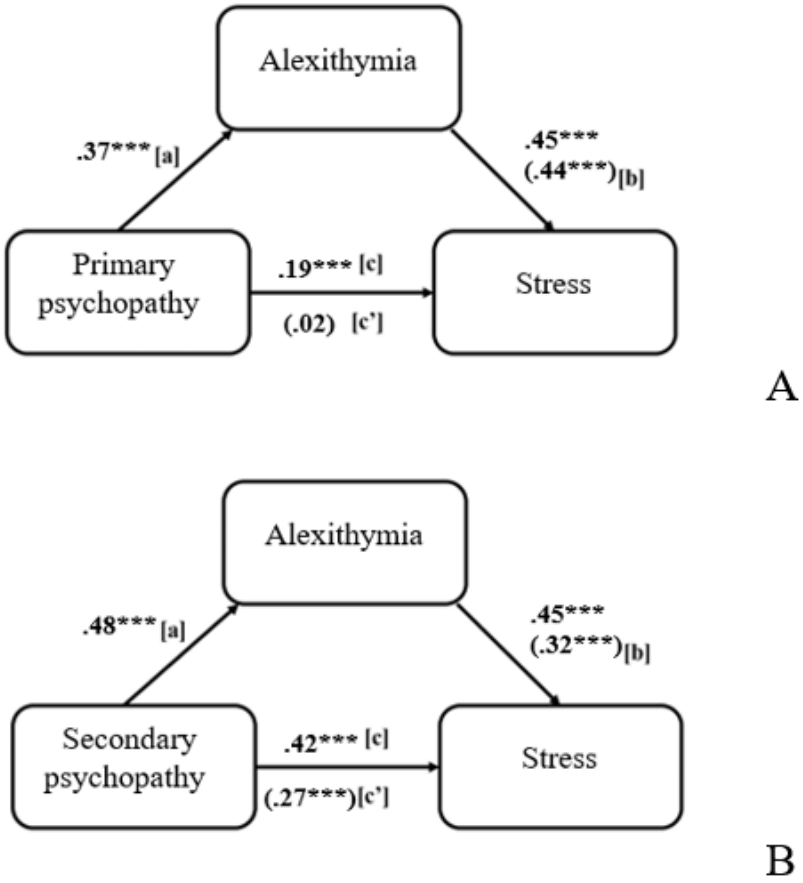

Figure 1. Alexithymia mediates the relationship between primary psychopathy and stress (A) and between secondary psychopathy and stress (B).
Note: *** $p < .001$. Values in parentheses are β's taken from the regression analyses, and the remainder values are zero-order correlations between variables. Paths c and c' in the figures correspond to total and direct effects, respectively.

Discussion

The goal of the research was to test the hypothesis that psychopathic personality traits associate with behavioural, self-reported stress. In addition, the literature reviewed supported the investigation of further research questions. Firstly, we tested whether perceived stress was associated only with the secondary variant of psychopathy, or whether psychopathic deficits in the primary variant were related to self-reported stress. Results showed that both psychopathic variants were positively correlated with self-reported stress, albeit stronger associations were detected between stress and secondary psychopathy. Findings related to the

link between stress and secondary psychopathy were expected might reflect the instable, impulsive, and anxious phenotype seen in secondary psychopathy (Derefinko, 2015; Karpman, 1941; Lykken, 1957). However, recent data reported by Durand (2018) noted that "adaptive" psychopathic traits, such as fearlessness and leadership were negatively linked to perceived stress. Dalkner et al. (2018) explored the cross-sectional associations between behavioural measurements of stress with psychopathic tendencies in psychiatric individuals, reporting that those with higher primary traits (e.g., Fearlessness Dominance) had lower levels of stress when compared to those with high secondary traits. Consequently, the weaker association between primary psychopathy and stress reported in our study deserves further consideration.

We also tested whether alexithymia would mediate the relationship between perceived stress and psychopathic personality traits. We found that 85% and 35% of the total effect of primary and secondary psychopathy on perceived stress go through difficulties in the perceptions of one's own emotional experiences, respectively. The partial mediation effect of alexithymia on the relationships between stress and psychopathic variants are in line with emotional deficits seen in individuals high in psychopathic traits (especially empathic deficits; Takamatsu, & Takai, 2017). Moreover, primary and secondary psychopathy are believed to have distinct aetiologies, which could explain differential associations to behavioural stress and alexithymic traits (Blonigen, Hicks, Krueger, Patrick, & Iacono2005; Cairncross, Veselka, Schermer, & Vernon, 2013; Lander et al., 2012).

There are a number of potential implications from this work. Strategies aiming to attenuate the negative consequences of both stress and psychopathy could target these specific deficits in identifying and describing feelings, as well as promoting some level of emotional attachment training (Herpertz & Sass, 2000). This study could also have legal implications as individuals high on perceived stress are more likely to perform violent offending (Silver et al.,

2011). Moreover, an enhanced perception of stress in those with elevated psychopathic personality traits could interact with a proneness to seek medical services; here, it might be interesting to follow the hypothesis that those seeking for specialised attention could do so driven by self-seeking, untruthful motives (Cleckley, 1941/1976).

Strategies might also be designed differently for those possessing with dominant traits in one or the other variant of psychopathy investigated. Preventive research might particularly benefit from screening for these deficiencies during early stages of human development, which has shown to result in better outcomes when compared to strategies implemented later in life (Ribeiro da Silva, Rijo, & Salekin, 2015).

Several limitations to this study should be addressed. For instance, the use of self-report measures could have bias in terms of social desirability and impression management, resulting into less accuracy in responses in comparison to those obtained via structured interviews for psychopathy, collateral and interpersonal measures, in which at least two different points of view are contrasted in order to get a clearer assessment of the individual (Hare & Neumann, 2006). In general population samples, this is usually not plausible to achieve for large numbers, and is a better methodology for those who have had significant contact with justice and other services. Additionally, data presented here included an uneven proportion of male and female participants and were collected at one time point only, so it was not possible here to explore potential casual relationships any further. This should be an avenue for future investigation, the interpretation of findings from mediation analyses should be considered in the light of the possibility that alternative models might occur in cross-sectional research. Psychopathic variants - along with the TAS-20 subscales and the PSS scale - might likewise be included as mediator variables (Judd & Sadler, 2008; Roe, 2012). Several methods have been proposed to support the decision of selecting the most appropriated model for these analyses, including reverse mediation (Lemmer & Gollwitzer, 2017), theoretical

examination, temporality, and experimental control (Wiedermann & von Eye, 2015). One suggested method includes a series of examinations as to whether a predictor does exist before the values of the mediator(s), followed by an examination if the values of the mediator(s) would occur before the values of the dependent variable (Tate, 2015). Other supported methods test the indirect effect of the independent variable on the dependent variable via the mediator against zero (Hayes, 2013). In this respect, resampling methods - including the bias-corrected bootstrap method - have been considered more robust when compared to other methods, such as the Sobel's test (Lemmer & Gollwitzer, 2017; MacKinnon, Lockwood, & Williams, 2004; Pieters, 2017).

Further research on behavioural processes associated with perceived stress in psychopathy could obtain clearer insights by adopting robust research designs. Among these, the use of longitudinal procedures certainly is desirable once it facilitates the establishment of casual links between variables (Kraemer, Yesavage, Taylor, & Kupfer, 2000). The inclusion of a diversified range of participants (e.g., clinical, forensic) from various cultural backgrounds would again add value to the scientific study of behavioural stress and its links with antisocial behaviours and psychopathic personality traits (Dalkner et al., 2018).

References

Bagby, R. M., Parker, J. D., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale—I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research, 38*(1), 23-32. doi:10.1016/0022-3999(94)90005-1

Baron, R, & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Beauchaine, T., Gatzke-Kopp, L., & Mead, H. K. (2007). Polyvagal theory and developmental psychopathology: Emotion dysregulation and conduct problems from preschool to adolescence. *Biological Psychology, 74*(2), 174-184. doi:10.1016/j.biopsycho.2005.08.008

Benning, S. D., Patrick, C. J., Hicks, B. M., Blonigen, D. M., & Krueger, R. (2003). Factor structure of the psychopathic personality inventory: Validity and implications for clinical assessment. *Psychological Assessment, 15*(3), 340-350.

Berry, W., & Feldman, S. (1985). *Multiple regression in practice*. Beverly Hills, CA: Sage Publications.

Bird, G., & Viding, E. (2014). The self to other model of empathy: Providing a new framework for understanding empathy impairments in psychopathy, autism, and alexithymia. *Neuroscience & Biobehavioral Reviews, 47,* 520-532.

Blonigen, D. M., Hicks, B. M., Krueger, R., Patrick, C. J., & Iacono, W. (2005). Psychopathic personality traits: Heritability and genetic overlap with internalizing and externalizing psychopathology. *Psychological Medicine, 35*(5), 637-648. doi:10.1017/S0033291704004180

Cairncross, M., Veselka, L., Schermer, J., & Vernon, P. (2013). A behavioral genetic analysis of alexithymia and the dark triad traits of personality. *Twin Research and Human Genetics, 16*(3), 690-697. doi:10.1017/thg.2013.19

Cima, M., & Raine, A. (2009). Distinct characteristics of psychopathy relate to different subtypes of aggression. *Personality and Individual Differences, 47*(8), 835–840. doi:10.1016/j.paid.2009.06.031

Cleckley, H. (1941/1976). *The Mask of Sanity: An attempt to clarify some issues about the so called psychopathic personality*. St Louis, MO: Mosby.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.

Crozier, J. C., Dodge, K. A., Fontaine, R. G., Lansford, J. E., Bates, J., Pettit, G., & Levenson, R. W. (2008). Social information processing and cardiac predictors of adolescent antisocial behavior. *Journal of Abnormal Psychology, 117*(2), 253-267. doi:10.1037/0021-843X.117.2.253

Dalkner, N., Reininghaus, E. Z., Riedrich, K., Rieger, A., Birner, A., Fellendorf, F. T., … Reininghaus, B. (2018). Psychopathic personality factor "Fearless dominance" is related to low self-reported stress-levels, fewer psychiatric symptoms, and more adaptive stress coping in psychiatric disorders. *Psychiatry Research, 270*, 68–77. doi:10.1016/j.psychres.2018.09.018.

Dargis, M., Newman, J., & Koenigs, M. (2016). Clarifying the link between childhood abuse history and psychopathic traits in adult criminal offenders. *Personality Disorders: Theory, Research, and Treatment, 7*(3), 221.

De Barros, D., Dias, A., Serafim, A., Castellana, G., Achá, M., & Busatto, G. (2013). Dimensional assessment of psychopathy and its relationship with physiological responses to empathic images in juvenile offenders. *Frontiers in Psychiatry, 4*. doi:10.3389/fpsyt.2013.00147

DeLisi, M., Reidy, D. E., Heirigs, M. H., Tostlebe, J. J., & Vaughn, M. G. (2018). Psychopathic costs: a monetization study of the fiscal toll of psychopathy features among institutionalized delinquents. *Journal of Criminal Psychology, 8*(2), 112–124. doi:10.1108/JCP-07-2017-0031

Demers, L. A., McKenzie, K. J., Hunt, R. H., Cicchetti, D., Cowell, R. A., Rogosch, F. A., ... & Thomas, K. M. (2018). Separable effects of childhood maltreatment and adult adaptive

functioning on amygdala connectivity during emotion processing. *Biological psychiatry: cognitive neuroscience and neuroimaging*, *3*(2), 116-124.

Derefinko, K. J. (2015). Psychopathy and low anxiety: Meta-analytic evidence for the absence of inhibition, not affect. *Journal of Personality, 83*(6), 693–709. doi:10.1111/jopy.12124

Dhingra, K., Boduszek, D., Palmer, D., & Shevlin, M. (2015). Psychopathy and self-injurious thoughts and behaviour: application of latent class analysis. *Journal of mental health*, *24*(1), 4-8.

Durand, G. (2018). A French translation and validation of the Durand Adaptive Psychopathic Traits Questionnaire: An investigation with community samples from France and Canada. *Plos One, 13*(9), e0204214. doi:10.1371/journal.pone.0204214

Eisenbarth, H., Godinez, D., du Pont, A., Corley, R. P., Stallings, M. C., & Rhee, S. H. (2019). The influence of stressful life events, psychopathy, and their interaction on internalizing and externalizing psychopathology. *Psychiatry Research, 272*, 438–446. doi:10.1016/j.psychres.2018.12.145

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175-191.

Fite, P., Raine, A., Stouthamer-Loeber, M., Loeber, R., & Pardini, D. A. (2010). Reactive and proactive aggression in adolescent males: Examining differential outcomes 10 years later in early adulthood. *Criminal Justice and Behavior*, *37*(2), 141-157.

Goldstein, R. B., Dawson, D. A., Smith, S. M., & Grant, B. (2012). Antisocial behavioral syndromes and 3-year quality-of-life outcomes in United States adults: Antisocial syndromes and quality of life. *Acta Psychiatrica Scandinavica*, *126*(2), 137-150.

Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. New York: Oxford University Press.

Grynberg, D., Luminet, O., Corneille, O., Grezes, J., & Berthoz, S. (2010). Alexithymia in the interpersonal domain: A general deficit of empathy? *Personality and Individual Differences, 49*(8), 845-850. doi:10.1016/j.paid.2010.07.013

Hare, D., & Neumann, C. (2006). The PCL-R assessment of psychopathy. In C. J. Patrick (Ed.), *Handbook of Psychopathy* (pp. 58-88). New York: Guilford.

Hare, R. D., Clark, D., Grann, M., & Thornton, D. (2000). Psychopathy and the predictive validity of the PCL-R: An international perspective. Behavioral Sciences & the Law, 18(5), 623–645. doi:10.1002/1099-0798(200010)18:5<623::AID-BSL409>3.0.CO;2-W

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

Henckens, M. J., Klumpers, F., Everaerd, D., Kooijman, S. C., Van Wingen, G. A., & Fernández, G. (2015). Interindividual differences in stress sensitivity: basal and stress-induced cortisol levels differentially predict neural vigilance processing under stress. *Social cognitive and affective neuroscience*, *11*(4), 663-673.

Herpertz, S. C., & Sass, H. (2000). Emotional deficiency and psychopathy. *Behavioral Sciences & the Law*, *18*(5), 567-580.

Jose, P. E. (2013). *MedGraph-I: A programme to graphically depict mediation among three variables: The internet version, version 3.0*. Victoria University of Wellington, Wellington, New Zealand. Retrieved 12 October 2016 from http://pavlov.psyc.vuw.ac.nz/paul-jose/medgraph/

Judd, C. M., & Sadler, M. S. (2008). The analysis of correlational data. In M. C. Roberts, & S. S. Ilardi (Eds.), *Handbook of Research Methods in Clinical Psychology* (pp. 115-137). Malden, MA: Blackwell.

Karpman, B. (1941). On the need of separating psychopathy into two distinct clinical types: The symptomatic and the idiopathic. *Journal of Criminal Psychopathology, 3*, 112-137.

Kraemer, H. C., Yesavage, J. A., Taylor, J. L., & Kupfer, D. (2000). How can we learn about developmental processes from cross-sectional studies, or can we? *American Journal of Psychiatry, 157*(2), 163-171. doi:10.1176/appi.ajp.157.2.163

Lander, G. C., Lutz-Zois, C. J., Rye, M. S., & Goodnight, J. A. (2012). The differential association between alexithymia and primary versus secondary psychopathy. *Personality and Individual Differences, 52*(1), 45-50. doi:10.1016/j.paid.2011.08.027

Lemmer, G., & Gollwitzer, M. (2017). The "true" indirect effect won't (always) stand up: When and why reverse mediation testing fails. *Journal of Experimental Social Psychology, 69*, 144-149. doi:10.1016/j.jesp.2016.05.002

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalized population. *Journal of Personality and Social Psychology, 68*(1), 151-158. doi:10.1037/0022-3514.68.1.151

Lilienfeld, S. O., & Widows, M. R. (2005). Psychopathic Personality Inventory-Revised: Professional manual. Lutz, Florida: Psychological Assessment Resources.

Loeber, R., Farrington, D. P., Stouthamer-Loeber, M., & Van Kammen, W. (1998). *Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence*. New York: Routledge.

Louth, S. M., Hare, R. D., & Linden, W. (1998). Psychopathy and alexithymia in female offenders. *Canadian Journal of Behavioural Science, 30*(2), 91-98. doi:10.1037/h0085809

Lykken, D. T. (1957). A study of anxiety in the sociopathic personality. *Journal of Abnormal and Social Psychology, 55*(1), 6-10. doi:10.1037/h0047232

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi:10.1207/s15327906mbr3901-4

Marcus, D. K., Fulton, J. J., & Edens, J. F. (2013). The two-factor model of psychopathic personality: Evidence from the Psychopathic Personality Inventory. *Personality Disorders: Theory, Research, and Treatment, 4*(1), 67–76. doi:10.1037/a0025282

Müller, J. L. (2010). Psychopathy: An approach to neuroscientific research in forensic psychiatry. *Behavioral Sciences & the Law*, n/a-n/a. doi:10.1002/bsl.926

Nederhof, E., Marceau, K., Shirtcliff, E. A., Hastings, P. D., & Oldehinkel, A. J. (2015). Autonomic and adrenocortical interactions predict mental health in late adolescence: The TRAILS study. *Journal of Abnormal Child Psychology, 43*(5), 847-861.

Patrick, C. J. (2018). Psychopathy as masked pathology. In C. J. Patrick (Ed.), *Handbook of Psychopathy* (2nd ed., pp. 3–21). New York: Guilford.

Pham, T. H. (2012). Psychopathy and traumatic stress. *Journal of Personality Disorders*, *26*(2), 213-225. doi:10.1521/pedi.2012.26.2.213

Pieters, R. (2017). Meaningful mediation analysis: Plausible causal inference and informative communication. *Journal of Consumer Research, 44*(3), 692-716. doi:10.1093/jcr/ucx081

Pollak, S., Cicchetti, D., & Klorman, R. (1998). Stress, memory, and emotion: Developmental considerations from the study of child maltreatment. *Development and psychopathology, 10*(4), 811-828.

Poythress, N. G., & Skeem J. L. (2006). Disaggregating psychopathy: Where and how to look for subtypes. In C. Patrick (Ed.), *Handbook of Psychopathy* (pp. 172–192). New York, NY: Guilford Press.

Ribeiro da Silva, D. Rijo, D., & Salekin, R. T. (2015). The evolutionary roots of psychopathy. *Aggression and Violent Behavior, 21*, 85-96. doi:10.1016/j.avb.2015.01.006

Roe, R. (2012). What is wrong with mediators and moderators? *European Health Psychologist, 14*(1), 4-10.

Sijtsema, J. J., Van Roon, A. M., Groot, P. F. C., & Riese, H. (2015). Early life adversities and adolescent antisocial behavior: The role of cardiac autonomic nervous system reactivity in the TRAILS study. *Biological Psychology*, *110*, 24-33.

Silver, E., Piquero, A. R., Jennings, W. G., Piquero, N. L., & Leiber, M. (2011). Assessing the violent offending and violent victimization overlap among discharged psychiatric patients. *Law and Human Behavior*, *35*(1), 49-59. doi:10.1007/s10979-009-9206-8

Takamatsu, R., & Takai, J. (2017). With or without empathy: Primary psychopathy and difficulty in identifying feelings predict utilitarian judgment in sacrificial dilemmas. *Ethics & Behavior*, 1-15. doi:10.1080/10508422.2017.1367684

Tate, C. U. (2015). On the overuse and misuse of mediation analysis: It may be a matter of timing. *Basic and Applied Social Psychology, 37,* 235-246. doi:10.1080/01973533.2015.1062380

Wiedermann, W., & von Eye, A. (2015). Direction of effects in mediation analysis. *Psychological Methods, 20*(2), 221. doi:10.1037/met0000027