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**Psychopathic Processing and Personality Assessment  
(PAPA): Exploring factor structure**

Journal:	<i>Journal of Criminal Psychology</i>
Manuscript ID	JCP-03-2021-0008.R1
Manuscript Type:	Research Paper
Keywords:	Psychopathy, PAPA, Psychopathy factor structure, Sex differences, Community, Measure development

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Manuscripts

## MANUSCRIPT DETAILS

TITLE: Psychopathic Processing and Personality Assessment (PAPA): Exploring factor structure

## ABSTRACT:

The primary aim was to assess whether the factor structure of the PAPA could be confirmed in a large community sample (n = 1,850), comprising three subsamples of adult men (n = 189, 248 and 198) and women (n = 499, 469 and 247). It was predicted that the four-factor solution originally proposed in earlier studies (i.e. dissocial tendencies; emotional detachment; disregard for others; lack of sensitivity to emotion) would be replicated; and produce a multi-dimensional structure consistent across sex.

The current study explored the structure of the newly developed Psychopathic Processing and Personality Assessment (PAPA) among a non-forensic sample.

Although exploratory analysis indicated a four-factor solution, the structure was different with "lack of sensitivity to emotion" being replaced by "responsiveness to perceived aggression". Confirmatory analyses supported this structure among women, yet a three-factor structure was preferred for men that excluded emotional detachment.

The study highlights the importance of attending to sex differences when assessing for psychopathy.

CUST\_PRACTICAL\_IMPLICATIONS\_(LIMIT\_100\_WORDS) :No data available.

CUST\_SOCIAL\_IMPLICATIONS\_(LIMIT\_100\_WORDS) :No data available.

This is the first confirmatory factor analysis completed on the PAPA, with the findings conveying its value when assessing for psychopathic traits among a community sample.

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8 *Purpose:* The current study explored the structure of the newly developed Psychopathic  
9  
10 Processing and Personality Assessment (PAPA) among a non-forensic sample.  
11

12 *Design:* The primary aim was to assess whether the factor structure of the PAPA could be  
13 confirmed in a large community sample ( $n = 1,850$ ), comprising three subsamples of adult  
14 men ( $n = 189, 248$  and  $198$ ) and women ( $n = 499, 469$  and  $247$ ). It was predicted that the  
15 four-factor solution originally proposed in earlier studies (i.e. dissocial tendencies; emotional  
16 detachment; disregard for others; lack of sensitivity to emotion) would be replicated; and  
17 produce a multi-dimensional structure consistent across sex.  
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26 *Findings:* Although exploratory analysis indicated a four-factor solution, the structure was  
27 different with 'lack of sensitivity to emotion' being replaced by 'responsiveness to perceived  
28 aggression'. Confirmatory analyses supported this structure among women, yet a three-factor  
29 structure was preferred for men that excluded emotional detachment.  
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35 *Research implications:* The study highlights the importance of attending to sex differences  
36 when assessing for psychopathy.  
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40 *Originality:* This is the first confirmatory factor analysis completed on the PAPA, with the  
41 findings conveying its value when assessing for psychopathic traits among a community  
42 sample.  
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49 **KERWORDS:** Psychopathy; PAPA; Psychopathy factor structure; Sex differences;  
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51 Community; Measure development.  
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## Background

Psychopathy captures a range of complex behaviours and personality traits, including callousness, egocentricity, irresponsibility, impulsivity and criminality (Dotterer et al., 2017a). It has traditionally been assessed via the Psychopathy Checklist-Revised (PCL-R; Hare, 2003), considered the gold standard for assessing psychopathy (Lynam & Gudonis, 2005). The PCL-R initially defined the construct through two highly correlated factors, comprising an interpersonal (also known as the 'personality' factor) and a behavioural component. Varying models have since been proposed that question this structure. Some have, for example, outlined a three-factor model identifying affective deficits and omitting antisocial behaviour (e.g. Cooke & Michie, 2001), and a more recent structure that splits the original personality and behavioural components into interpersonal, affective, lifestyle and antisocial facets (i.e. the four 'facet' model; Hare & Neumann, 2005). It has become apparent, however, that there remains little consensus on the putative multidimensional structure underpinning this concept.

Psychopathy was traditionally considered as unitary with a single underlying aetiology (e.g. Neumann et al., 2007); yet, multidimensional findings have shifted this focus, and as a by-product, generated interest in exploring psychopathy as a heterogeneous construct manifesting differently across populations (Coid et al., 2012; Miller & Lynam, 2012; van Dongen et al., 2017). Although predominantly viewed as a forensic concern (Wilks-Riley & Ireland, 2012), there is growing empirical interest in the factor structure of psychopathy among community samples, where antisocial behaviour is considered absent and more emphasis is instead placed on maladaptive personality traits, which have been argued to be at the centre of 'true' psychopathy (Cleckley, 1982) and therefore become crucial for understanding its structure.

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3 In response to increased interest in the disorder within normative samples (i.e. non-  
4 forensic populations), several psychopathy self-report measures have been developed to  
5 assess for abnormal personality traits. This includes the Levenson Self-Report Psychopathy  
6 Scale (LSRP; Levenson et al., 1995), the Personality Assessment Inventory (PAI; Morey,  
7 2007), the Psychopathic Personality Inventory - Short Form (PPI-SF; Lilienfeld, 1990), the  
8 Triarchic Psychopathy Measure (TriPM, Patrick, 2010), the Self-Report Psychopathy Scale -  
9 fourth edition (SRP-4; Paulhus et al., 2014), the Psychopathic Personality Traits Scale (PPTS;  
10 Budosek et al., 2016), and the Psychopathic Processing and Personality Assessment (PAPA;  
11 Lewis et al., 2017). Although use of these measures has been criticised for reasons relating to  
12 social desirability, individuals scoring high on psychopathy have, in fact, been identified as  
13 producing less positive self-reports (Verschuere et al., 2014). Such measures have also been  
14 noted to meaningfully correlate with interview-based approaches to assessment, such as that  
15 adopted by the PCL-R (Patrick, 2010). This demonstrates, therefore, some validity in  
16 accurately capturing psychopathy.

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19 The availability of psychopathy self-report measures makes them an attractive tool for  
20 research purposes (Kelsey et al., 2014), as does their capability to assess the dimensionality  
21 of psychopathic traits among those exhibiting lower levels of the disorder (Lilienfeld et al.,  
22 2006). However, each self-report is known to differ in their ability to measure the respective  
23 traits of psychopathy (Tsang et al., 2018). The LSRP, for example, defines the construct as  
24 being underpinned by two stable components closely resembling PCL-R Factor I and II (i.e.  
25 primary and secondary psychopathy). The SRP-4 mirrors this to some extent, assessing the  
26 four-facet structure underlying the two-factor PCL-R model (Tew et al., 2015). Yet, the PPI  
27 deviates from both of these measures and holds general support for two higher order factors  
28 among community samples that pertain to fearless dominance and self-centred impulsivity  
29 (Ruchensky et al., 2018). A third factor has also been proposed, comprising traits reflective  
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3 of cold-heartedness and carefree non-planfulness (Neumann et al., 2008). According to the  
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5 TriPM, disinhibition and meanness underpin psychopathy, as does boldness, which in this  
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7 instance is viewed as both an adaptive (Dotterer et al., 2017b) and maladaptive (Sica et al.,  
8  
9 2015) trait.  
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12 Despite these differences, factors across measures are known to complement each  
13  
14 other by accounting for different latent trait ranges (Tsang et al., 2018). Each self-report may  
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16 be capturing different but related domains of the concept, thus reinforcing the  
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18 conceptualisation of psychopathy as a multidimensional construct, as opposed to  
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20 unidimensional. The use of multiple tools, including the refinement and implementation of  
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22 newer measures, such as the PAPA, has been recommended to examine a much broader  
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24 concept of psychopathy (Tsang et al., 2018; Tsang & Salekin, 2018). This approach is also  
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26 likely to be advantageous when attending to sex differences, as little is known about the  
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28 expression of psychopathy in women.  
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33 A network analysis of the LSRP, PAI, PPI-SF and SRP among a sample of 1,180  
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35 university students ( $n = 350$  men and 869 women) identified manipulateness and  
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37 irresponsibility/impulsivity to have the strongest central indices within item-level  
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39 psychopathy models. Using all subscales, social deviance, stimulus seeking and interpersonal  
40  
41 affective traits also presented as core domains in the network structure of psychopathy (Tsang  
42  
43 & Salekin, 2018). Marcus et al. (2018) corroborated the importance of interpersonal  
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45 manipulation, and also defined callousness as a core feature of the disorder, but like Tsang  
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47 and Salekin, did not examine their relevance to psychopathy to women.  
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51 There appears a tendency to overlook sex differences in psychopathy, with much of  
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53 the literature sampling men, or both sexes, but failing to account for women specifically.  
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55 Psychopathic traits have largely been associated with antisocial men across a variety of  
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57 samples (Lilienfeld & Fowler, 2006); thus, it is this population that has naturally been of  
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3 most interest. However, despite the reported low prevalence of psychopathy among women  
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5 (Nicholls et al., 2005; Verona & Vitale, 2006), there is growing evidence to suggest that  
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7 women also engage in a range of dissocial behaviours relevant to the construct (Hare, 2003;  
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9 Nicholls et al., 2005). Yet, it is the function and expression of these behaviours that has been  
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11 noted to differentiate between sex (Hare, 2003). An assessment of psychopathy should  
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13 ideally consider these differences and measure the construct in both men and women with  
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15 equal accuracy (Marion & Sellbom, 2011).  
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20 Despite a relative limited evidence base, self-report psychopathy has been identified  
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22 to operate consistently across sex with few exceptions (Hauck-Filho & Teixeira, 2014; Miller  
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24 et al., 2011). For example, when compared to men, women residing in the community were  
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26 noted to endorse items on the LSRP that conveyed a propensity to manipulate rather than  
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28 physically harm others, which was the preferred option for men (Gummelt et al., 2012).  
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30 Divergent relations were also evidenced for impulsivity-related traits on the third version of  
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32 the self-report psychopathy scale (SRP-III; Neumann et al., 2012). Women were more  
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34 strongly associated with sensation seeking, an inability to resist urges in the presence of  
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36 positive affect, and difficulty considering the consequences of one's own behaviour (Miller et  
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38 al., 2011). There is little empirical explanation for these differences, yet subtle variations in  
39  
40 the manifestation of psychopathy have been linked to varying environmental processes, such  
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42 as adverse early experiences (e.g. Colins et al., 2016; Watts et al., 2017).  
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47 Support for a unique maltreatment profile has emerged from a person-oriented  
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49 analysis performed on a large community sample ( $n = 1,186$  men and 1,314 women), which  
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51 found women exhibiting a psychopathic personality to present with severe emotional  
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53 difficulties, engage in reactive forms of aggression and more likely to have been exposed to  
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55 sexual abuse (Colins et al., 2016). Watts et al. (2017) also identified psychopathy and  
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57 childhood maltreatment to vary as a function of sex, with men expressing boldness traits (i.e.  
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3 stress immunity, fearlessness) as less likely to experience or report adverse early experiences  
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5 compared to women. Men with pronounced disinhibition and meanness features, however,  
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7 did report these outcomes.  
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10 Childhood maltreatment has been connected to various psychopathologies, including  
11 internalising symptoms (e.g. Esteves et al., 2017) and externalising behaviours (e.g. Barch et  
12 al., 2018). The range of outcomes has been attributed to disruption of the parent-child  
13 attachment characterised by neglect or emotional maltreatment (Pietrek et al., 2013) Indeed,  
14 variants of psychopathy have been linked to a unique maltreatment profile, with observed  
15 differences in *affect* elucidating potential mechanisms, or at least providing a pathway for  
16 varying expressions of the disorder to form (Dargis & Koenigs, 2018). This is important to  
17 account for since it begins to suggest that there may be functional differences in psychopathy,  
18 which arguably could emerge at the trait level and suggesting a more heterogeneous approach  
19 to describing and measuring psychopathy can be argued for.  
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33 Emotionally abusive relationships experienced during childhood are thought a result  
34 of significant levels of distress that are detrimental to a child's ability to relate to others, to  
35 interpret others' feelings and perspective take (Dargis & Koenigs, 2018), as well as  
36 increasing their risk of biased, often hostile, responding (Beeney et al., 2015). As such, these  
37 relationships are known to give rise to deficits in cognitive and emotional processing, which  
38 interact to form a dysfunctional profile that underpins psychopathy (Baskin-Sommers et al.,  
39 2011). In terms of affect specifically, the PCL-R was initially stated to broadly capture two  
40 forms of opposing emotional difficulties. Factor I was associated with an affective deficit  
41 characterised by callous and unemotional traits (i.e. an extreme form of emotional  
42 detachment), low levels of negative emotionality, and internalising symptoms (Long et al.,  
43 2014). Factor II, in contrast, reflected an affective disturbance representing emotional  
44 instability, psychological distress and externalising symptoms (Skeem et al., 2007). A lack of  
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3 empirical support for a complete absence of emotion in Factor I psychopathy (e.g. Derefinko,  
4 2015; Kosson et al., 2018) has seen researchers challenge this conceptualisation.  
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8 There is a growing body of evidence for broader emotional disturbances in  
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10 psychopathy, and which includes the regulation of emotion (Garofalo et al. 2020a). Utilising  
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12 an offender sample ( $n = 268$  men), Garofalo et al. (2018) found emotion dysregulation not to  
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14 be restricted to behavioural traits (i.e. Factor II), rather the largest effect sizes were identified  
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16 for the affective and lifestyle domains of psychopathy; thus, extending emotion dysregulation  
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18 to the affective traits underpinning Factor I. These findings have been corroborated within  
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20 community samples comprising of men and women (e.g. Garofalo et al. 2019; Garofalo et al.  
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22 2020a), and which conveys a role for emotion dysregulation in psychopathy across sex.  
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24 When considered collectively, such findings also contradict the *dual-pathway model* (see  
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26 Fowles & Dindo, 2009) that equates Factor I psychopathy with intact emotion regulation.  
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28 Psychopathic individuals thus do not appear to be completely devoid of emotion; instead,  
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30 their emotional world seems far more complex than originally conceptualised (Ireland et al.,  
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32 2020) and which is subsequently not well captured within assessments of psychopathy,  
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34 including self-report.  
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40 It has been suggested that greater consideration is to be afforded to emotion in  
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42 psychopathy as having a functional purpose (Garofalo et al., 2019; Glenn et al., 2017), and  
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44 where a role for emotion detachment *and* emotion dysregulation has been proposed (Ireland  
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46 et al., 2020). The expression of emotion (or in some instances, lack of) has been conceptually  
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48 considered a mechanism through which psychopathy and dissocial tendencies, such as  
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50 aggression, present (Garofalo et al., 2019; Garofalo et al., 2020b; Ireland et al., 2020). For  
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52 instance, evidenced difficulty in refraining from impulsive behaviour in situations of strong  
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54 emotional arousal (e.g. anger; Kosson et al., 2020) has highlighted a link between emotion  
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56 dysregulation and more reactive forms of aggression in psychopathy. However, at the  
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3 opposing end of the scale, it is the limited awareness and understanding of emotion (i.e.  
4 emotional detachment) that has been conveyed as facilitating more cold, predatory forms of  
5 aggression (Garofalo & Neumann, 2018; Ireland et al., 2020), and thus associated with  
6 psychopathic individuals with a callous-affective disposition (Garofalo et al., 2020b). Though  
7 there has been limited attention to sex differences in this regard, women have been found to  
8 present with a similar pattern of emotional detachment to that evidenced in men (Seara-  
9 Cardoso et al., 2013). Yet, emotion dysregulation has been found to feature more strongly in  
10 women exhibiting psychopathic traits (Sevecke et al., 2016).

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22 Nevertheless, there is clear value in attending to emotional functioning when  
23 understanding psychopathy as a dynamic construct, and which is also echoed within DeLisi's  
24 (2009) *unified theory of crime* that views psychopathy as a manifestation of criminality  
25 regardless of demographic, as well as comprising of various *affect* challenges which include  
26 noticeable differences in how psychopathic individuals experience their emotional world  
27 when compared to those absent of psychopathy. Notably, DeLisi's theory considers the core  
28 characteristics of psychopathy to embody the conceptual nature of criminality, viewing the  
29 construct itself as the motivation for offending, and where emotion has a contextual influence  
30 (DeLisi, 2009).

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42 It becomes evident that a multidimensional approach is required when understanding  
43 psychopathy, and which naturally extends to its assessment. There is a need to consider the  
44 context in which psychopathy manifests, and where there is value in attending to the  
45 underlying factors, such as affect, that may determine its expression (Rogstad & Rogers,  
46 2008). One self-report measure that may attend to these factors more closely is the PAPA, as  
47 this tool was developed to explicitly **measure disturbances** in cognition and affect in  
48 psychopathy that arise from developmental challenges. As such, the PAPA is thought to  
49 capture more discrete elements of psychopathy that may influence its manifestation and is  
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3 thus not simply a replication of the PCL group of measures (Lewis et al., 2017). The PAPA  
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5 has established good reliability in men across populations, with construct validity also being  
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7 evidenced through its ability to correlate with maladaptive schemas (Lewis, 2014), which  
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9 represent dysfunctional cognition about the self, others and the world arising from difficult  
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11 childhood experiences. However, its structural properties are yet to be determined in detail,  
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13 and to comprise women.  
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17 The current study aims to further investigate the nature and structure of psychopathy,  
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19 as defined by the PAPA, and attending specifically to sex differences. Both parallel and  
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21 confirmatory factor analyses will be employed across three adult community samples of men  
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23 and women. It was hypothesised that: (1) The original PAPA four-factor solution proposed  
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25 by Lewis *et al.* (2017) would be replicated; (2) That the multidimensional structure of the  
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27 PAPA would be consistent between sex.  
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## 33 Method

### 34 *Sample*

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36 Three samples, of which all were recruited online, were employed as follows<sup>1</sup>:  
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#### 39 *STUDY I: Participants*

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42 Seven hundred and twenty-five adult participants (189 men and 499 women),  
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44 sampled from the community. Thirty-seven participants did not disclose their sex. Mean age  
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46 for the sample was 27.7 years (SD = 10.2) and 27.4 years (SD = 9.9) and 27.8 years (SD =  
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48 10.3) for men and women respectively.  
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#### 50 *STUDY II: Participants*

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53 Seven hundred and eighteen adult community participants took part (Mean age =  
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55 23.4 years, SD = 8.0) of which 248 were men (Mean age = 22.7 years, SD = 7.5) and 469  
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57 women (Mean age = 23.8 years, SD = 8.3). One participant did not indicate their sex.  
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### *STUDY III: Participants*

Four hundred and forty-five adult community participants were recruited (Mean age = 24.4 years, SD = 7.5). Of these, 198 were men (Mean age = 24.3 years, SD = 6.9) and 247 were women (Mean age = 24.6 years, SD = 8.0).

### *Measures*

All completed the Psychopathic Processing and Personality Assessment (PAPA; Lewis et al., 2017). The PAPA comprises 29 statements. One item was omitted from the analysis as it serves as a measure of trait stability rather than psychopathy per se (i.e. 'As a person, I have never changed'). Participants were required to respond to each item via a five-point Likert scale ranging from (1) 'very unlike me' to (5) 'very like me'.

### *Procedure*

A university ethics committee granted ethical approval. Participants completed the PAPA online. All received relevant information prior to consenting and undertaking the research. A debrief form was provided upon completion. Analyses were performed using SPSS and AMOS.

## Results

Initially, the structure of the PAPA was examined in an attempt to confirm its published (Lewis et al., 2017) four-factor structure (STEP I). Following this, exploratory analyses (STEP II) were implemented to determine the presence of sex differences. The final stage (STEP III) was performed to confirm the revisions to the structure of the measure. All models were recursive, were identified and standardised with variances set to 1.00.

### Data screening

Little's MCAR test revealed that data was missing at random across all three studies: STUDY I:  $\chi^2 = 351.11$ ,  $df = 321$ ,  $p > .05$ ; STUDY II:  $\chi^2 = 182.75$ ,  $df = 162$ ,  $p > .05$ ; STUDY III:  $\chi^2 = 49.23$ ,  $df = 54$ ,  $p > .05$ ; and replaced using Expectation Maximisation (EM). No univariate outliers were identified. Using Mahalanobis Distance with  $p < .001$ , 33 cases were highlighted as multivariate outliers in STUDY I and deleted from the dataset. A further 42 cases were removed from STUDY II and 14 from STUDY III.

### STEP I: Confirming the published four-factor structure of Lewis et al. (2017)

The first confirmatory factor analysis was performed using data from STUDY I to determine whether the PAPA was unidimensional. The model demonstrated a poor fit with a single latent variable ( $\chi^2 = 2503.41$ ,  $df = 350$ ,  $p < .001$ ; RMSEA = .09 [.09-.10]; GFI = .75; CFI = .65; ECVI = 3.79 [3.56-4.02]).

Following demonstration of a non-unidimensional structure, the aim was to confirm the PAPA structure identified by Lewis et al. (2017), again using the data from STUDY I. Lewis et al. (2017) proposed a four-factor structure comprising dissocial tendencies (seven items), emotional detachment (four items), lack of sensitivity to emotion (seven items) and disregard for others (10 items). A decision was made to explore these factors among the sample as a whole, since Lewis et al. (2017) did not differentiate between men and women when outlining the factor structure. Covariances were added between factors to reflect their correlations. The model produced is illustrated in Figure 1.

< Figure 1 to go about here >

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3 The four-factor model demonstrated an acceptable fit ( $\chi^2 = 1645.60$ ,  $df = 347$ ,  $p <$   
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5  $.001$ ; RMSEA =  $.07$  [ $.07$ -. $08$ ]; GFI =  $.85$ ; CFI =  $.79$ ; ECVI =  $2.55$  [ $2.38$ - $2.74$ ]), as RMSEA  
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7 was below  $.08$  and had a lower ECVI (Hu & Bentler, 1999). Attending to modification  
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9 indices and adding item covariances made no significant improvement to model fit<sup>2</sup>. The next  
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11 step was to explore the PAPA structure across sexes.  
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17 *STEP II: Exploring the factor structure of the PAPA across sexes*  
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20 Inspection of the correlation matrix revealed many coefficients greater than  $.40$   
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22 for both men and women. A Kaiser-Meyer-Olkin value of  $.83$  for men and  $.88$  for women  
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24 was achieved, and Bartlett's test of Sphericity was statistically significant for each sample.  
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26 Thus, the data was deemed suitable for exploratory factor analysis for both men and women  
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28 (using STUDY II).  
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31 Factor analyses were initially performed separately for men and women. Parallel  
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33 Analysis (PA) was adopted to more strictly inform the number of factors evident. PA  
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35 alongside the initial factor outlines and explained variance indicated a four-factor solution  
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37 that was similar across men and women. Thus, a Principal Components Analysis (PCA) with  
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39 Varimax Rotation was used on the sample (i.e. men and women combined), as no  
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41 assumptions about the model were made.  
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47 < Table 1 to go about here >  
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52 Results are presented in Table 1, along with each item's original positioning in the  
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54 PAPA and reliability analyses. Four items (6, 11, 24 and 26), 'I have been described as a  
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56 cruel person who does not worry about hurting others', 'I find it impossible to resist  
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58 temptation', 'If I do something wrong I will feel bad about it' and 'I always accept  
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responsibility for what I do', did not load. Factor 1 was best captured as *Disregard for Others*; Factor 2 as *Emotional Detachment*; Factor 3 as *Dissocial Tendencies*; and Factor 4 as *Responsivity to Perceived Aggression*. The next step aimed to confirm the revised structure in a sample of men and women using data from STUDY III.

### STEP III: Confirming the revised structure of the PAPA

Reliability analyses were performed for each factor separately for men and women. Alphas ranged from acceptable to good, with all item-to-total correlations positive (Men: Factor 1,  $\alpha = .83$ ; Factor 2,  $\alpha = .44$ ; Factor 3,  $\alpha = .79$ ; Factor 4 =  $.82$ ; Women: Factor 1,  $\alpha = .90$ ; Factor 2,  $\alpha = .43$ ; Factor 3,  $\alpha = .88$ ; Factor 4,  $\alpha = .87$ ). The exclusion of item 14, 'I am not that bothered about others', increased the alpha of Factor 2 to  $.70$  for men and  $.73$  for women.

Two confirmatory factor analyses were performed to confirm the factor structure identified during STEP II in men and women separately. Covariances were added between factors to reflect their correlations<sup>3</sup>. For men, the revised four-factor structure demonstrated an acceptable fit ( $\chi^2 = 456.98$ ,  $df = 228$ ,  $p < .001$ ; RMSEA =  $.073$  [ $.06-.08$ ]; GFI =  $.83$ ; CFI =  $.87$ ; ECVI =  $2.94$  [ $2.64-3.29$ ]). Attempts to improve this model were made by examining modification indices and adding item covariances. The factor *Emotional Detachment* appeared to fit the model poorly. Removal of this factor brought the model fit to its optimum where no further improvement could be achieved ( $\chi^2 = 296.94$ ,  $df = 152$ ,  $p < .001$ ; RMSEA =  $.071$  [ $.06-.08$ ]; GFI =  $.86$ ; CFI =  $.90$ ; ECVI =  $1.98$  [ $1.74-2.27$ ]). This model is presented in Figure 2.

< Figures 2 and 3 to go about here >



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3 The four-factor solution demonstrated an acceptable fit among women<sup>4</sup> ( $x^2 =$   
4 617.07,  $df = 228$ ,  $p < .001$ ; RMSEA = .084 [.07-.09]; GFI = .80; CFI = .89; ECVI = 2.96  
5 [2.67-3.28]). The addition of an item covariance improved model fit, specifically with  
6 regards to GFI and CFI, with a reduction in RMSEA also evidenced ( $x^2 = 541.53$ ,  $df = 227$ ,  
7  $p < .001$ ; RMSEA = .076 [.07-.08]; GFI = .83; CFI = .91; ECVI = 2.65 [2.39-2.95]). Figure 3  
8 illustrates this model.  
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## 19 Discussion

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21 The current study supported the four-factor model delineated by Lewis et al.  
22 (2017), in that the PAPA demonstrated an acceptable fit for dissocial tendencies, emotional  
23 detachment, lack of sensitivity to emotion, and disregard for others. The prediction was  
24 therefore supported. Yet, when attending to sex differences, principal factor analyses  
25 revealed a four-factor solution consistent between men and women, which was almost  
26 identical to that proposed by Lewis et al. (2017). However, in this instance, a lack of  
27 sensitivity to emotion was replaced by a new component; responsivity to perceived  
28 aggression. Confirmation of this structure revealed that the four-factor solution was  
29 appropriate for women, whilst a three-factor solution excluding emotional detachment  
30 provided a more accurate fit for men.  
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44 Confirmatory analyses performed on men and women separately demonstrated two  
45 interesting findings: (1) that the factors underpinning the PAPA were not distinct and in fact  
46 covary; and (2) for men, a three-factor solution was preferable. The first indicated that the  
47 factors underpinning psychopathy for both men and women are not distinct and correlate.  
48 This finding is comparable to established models of psychopathy (Cooke & Michie, 2001;  
49 Hare, 2003; Hare & Neumann, 2005) and may suggest that the factors represent a single  
50 higher order factor of psychopathy. Analysis of the PAPA as a unidimensional measure  
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3 revealed a poor fit, yet this was completed for the sample as a whole and did not attend to  
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5 unidimensionality in men and women separately. Thus, the current study indicates that there  
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7 may be value in administering the PAPA both as a unidimensional and multidimensional  
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9 measure since it remains unclear as to whether or not focusing on individual factors is of  
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11 more value than using the higher order factor of psychopathy, when assessing men and  
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13 women separately.  
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17 The factor structure of the PAPA was different for men and women. This did not  
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19 support the prediction that the multidimensional structure of the PAPA would be replicated  
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21 between sex; although a four-factor solution was a good fit for women, it was not for men.  
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23 Psychopathy in men was underpinned by dissocial tendencies, disregard for others, and  
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25 responsivity to perceived aggression, thus somewhat resembling the interpersonal and  
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27 behavioural features of the PCL-R. This structure was also relevant to women; however, for  
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29 women, emotional detachment also emerged as an important factor. The current study  
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31 therefore indicates that whilst there are shared features, psychopathy does not present in a  
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33 uniform manner across sex. This is consistent with previous findings (e.g. Gummelt et al.,  
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35 2012; Miller et al., 2011).  
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41 Emotional detachment appeared solely responsible for the structural differences in  
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43 psychopathy between men and women. The absence of emotional detachment among men is  
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45 an unusual finding, especially as this characteristic is considered a core diagnostic feature of  
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47 psychopathy (Hare, 2003; Marcus et al., 2018). Yet, given that the remaining three factors  
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49 were present for both sexes, it would be unrealistic to assume that the difference in the  
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51 expression of psychopathy was solely linked to a unique maltreatment profile, as others have  
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53 previously suggested (Dargis & Koenigs, 2018). This is not to say that childhood experiences  
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55 are not responsible for the observed differences in affect, rather it could be suggested that  
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57 there is a response difference between men and women; it could be speculated, for example,  
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3 that men may experience past aversive events differently to women (Watts et al., 2017) in  
4 terms of how it manifests and/or is reported. The latter may be particularly important and  
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6 what could be identified here is a *reporting* difference between sex in terms of variables  
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8 linked to emotional detachment and not an experience difference.  
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12 This explanation does not, however, account for responsivity to perceived  
13 aggression and a disregard for others. These were identified as important factors for men and  
14 women. The presence of these factors may convey a shared rejecting and hostile  
15 developmental experience, thus lending itself to an expression or variant of psychopathy  
16 consistent across sex. However, it may be that men exhibiting psychopathic traits prefer to  
17 externalise their difficulties through antisocial behaviour, as supported by the presence of  
18  
19 dissocial tendencies. Women may also use this as a method of coping alongside more internal  
20 means, hence the emergence of emotional detachment and the subtle difference in factor  
21 structure. Thus, there could be more internalising of difficulties for women. This is,  
22 nevertheless, speculative and represents a direction for future research.  
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35 The finding for emotional detachment aligns women more closely to the PCL-R  
36 Factor I (i.e. the interpersonal/affective features of psychopathy), since it is this component of  
37 psychopathy that has been associated with an affective *deficit* serving to promote a lack of  
38 moral emotion (Hare, 2003; Hare & Neumann, 2005; Skeem et al., 2007). **Although there is**  
39 **emerging evidence for emotion dysregulation within this factor (Garofalo et al., 2019), which**  
40 **needs to be considered.** Factor II (i.e. impulsive and irresponsible behaviour) relates more to  
41 reactive forms of affect; thus, difficulties in regulating emotion. Emotion dysregulation has  
42 certainly been evidenced among women presenting with psychopathy (**Garofalo et al., 2019;**  
43 **Garofalo et al., 2020a;** Sevecke et al., 2016). It could be speculated that for women to report  
44 poor management of emotion, they have to first acknowledge this and attend to it. Thus, the  
45 findings here may also reflect a reporting bias among women rather than an absence of  
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3 emotion regulation difficulties. Indeed, it may also be that affective disturbances in  
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5 psychopathy, specifically among women, present along a continuum with detachment at one  
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7 end of the scale and poor management/regulation at the other, and which would be consistent  
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9 with more recent thinking (e.g. Ireland et al., 2020). This notion would require psychopathy  
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11 to be assessed dynamically and is a consideration for future work.  
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15 Responsivity to perceived aggression, as a factor, may also relate to emotion  
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17 regulation difficulties for the sample. Hostility presenting as a form of cognitive impulsivity,  
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19 notably hostile attribution bias, may in fact represent underlying impulsive/dysregulated  
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21 forms of emotion, particularly anger, and which would afford further credibility to the notion  
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23 of emotion having a functional purpose in psychopathy (Garofalo et al., 2019; Glenn et al.,  
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25 2017). Psychopathy has also been associated with the maladaptive regulation of anger  
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27 (Kosson et al., 2020) and which appears to be manifesting here. Nevertheless, the proposed  
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29 interaction between cognition and affect is well documented in the psychopathy literature  
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31 (Baskin-Sommers et al., 2011) and the occurrence of this factor could provide an example of  
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33 this mechanism among a community sample. Indeed, the presence of affective difficulties  
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35 should not be discounted for men, as additional work is required to refine the PAPA and  
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37 clarify the expression of this particular factor.  
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43 Dissocial tendencies have primarily been associated with psychopathy among  
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45 men in forensic services, yet research (e.g. Nicholls et al., 2005), including the present study,  
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47 has established a role for antisocial traits within community samples, including women.  
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49 There is thus evidence of criminality as being a stable characteristic in psychopathy,  
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51 providing further support for the unified theory (DeLisi, 2009) relevant to the construct. To  
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53 assess psychopathy in both sexes, measures should continue to attend to these characteristics.  
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55 This would support the need for a broader assessment of psychopathy so that its  
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57 heterogeneity (Tsang et al., 2018) and range can be captured more completely across  
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3 samples. Indeed, it seems unusual for a personality construct to be so focused on unique  
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5 samples, such as a forensic population, when the determination of personality challenges can  
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7 only be truly considered if there is identification across a broad range of samples. This allows  
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9 for extremes in personality to be more readily determined. However, psychopathy as a  
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11 concept has increasingly been focused only on unique, and not community, samples. In  
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13 addition, whilst the PAPA successfully attended to several core features of psychopathy (i.e.  
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15 those pertinent to the PCL-R), there are outstanding traits also noted to have utility when  
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17 assessing in community samples (e.g. the concept of ‘boldness’; Watts et al., 2017). Thus,  
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19 administering a range of self-report tools would prove invaluable when attending to the  
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21 constellation of traits often associated with this multidimensional construct (Tsang et al.,  
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23 2018).

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28 The current study is not without its limitations. A broader assessment of psychopathy  
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30 is encouraged for future research, one that attends holistically to the construct. The role of  
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32 affect, more specifically, and how this presents on the PAPA warrants further investigation to  
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34 clarify its lack of association among men, and expression in women. The addition of a  
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36 ‘personality functioning’ profile to the PAPA would also enable a more dynamic assessment  
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38 of psychopathy; one that examines the severity of the disorder as well as capturing core  
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40 difficulties spanning the domains of interpersonal, cognition and affect. This would mirror  
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42 more modern approaches to personality assessment (Bender et al., 2011), which are  
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44 increasingly beginning to emerge, such as the more functional assessment now undertaken as  
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46 part of the ICD-11 approach to diagnosing personality disorder.

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51 The findings of the current study, nevertheless, illustrate that the PAPA is an  
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53 internally reliable measure when applied to a sample where psychopathy is expected to  
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55 present at lower levels, in comparison to forensic samples. However, further exploration is  
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57 required to determine the generalisability of the current findings to different populations, as  
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3 there is some evidence of heterogeneity in psychopathy. Exploration of the PAPA across  
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5 samples would also permit the possibility of weighting items, or incorporating population  
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7 specific components (Lewis et al., 2017), to accurately capture structural differences in  
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9 psychopathy representative of manifestations and aetiologies that are unique to samples.  
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12 The extent to which the measure is ecologically valid in terms of response bias was  
13 not examined. Future research may therefore consider use of a deception scale alongside the  
14 PAPA to identify individuals who are prone to socially desirable responding. It is also worth  
15 noting that despite the present study employing both exploratory and confirmatory analyses,  
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17 it remains correlational in nature and therefore did not permit an investigation into the  
18 expression of the components deemed integral to the PAPA. Understanding the function of  
19 these would arguably expose more elusive sex differences in psychopathy and could  
20 represent a direction for future focus.  
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31 Regardless of accepted limitations, the current study illustrates the importance of  
32 attending to sex differences when assessing psychopathy as a multidimensional construct  
33 among community samples. Similarities and differences in factor structure between sex were  
34 noted, with emotional detachment being relevant only to women. This is not to assume,  
35 however, that affect does not have a pertinent role in the expression of psychopathy among  
36 men, it may just present more discretely. A valuable focus for future research would be to  
37 refine and further develop the PAPA to attend to affect in psychopathy more closely, whilst  
38 also extending its focus to include a dynamic measure addressing trait severity and functional  
39 impairment.  
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#### 52 53 54 *Disclosure statement*

55  
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#### 41 42 43 44 45 Footnotes

46  
47 [1] The data was derived from a larger dataset of psychopathy projects. The current study is  
48  
49 wholly unconnected with the issues addressed in those studies. No structural exploration of  
50  
51 the PAPA data has previously been conducted and remains the sole purpose of the present  
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53 paper.  
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56 [2] Although it is well established that highly correlated [within-factor] measurement errors  
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58 can be added to the model as covariances to improve fit, their use can also result in a loss of  
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3 meaning and therefore should only be adopted with a theoretical justification for doing so  
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5 (Gerbing & Anderson, 1984). Item covariances were only included on models where a  
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7 significant improvement in fit was noted.  
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10 [3] Adhering to the guidelines of Marsh et al. (2013), item parcelling was not employed in  
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12 the present study, as there were an insufficient number of items per factor, and  
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14 unidimensionality of the constructs at item level for the particular models and sample were  
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16 not considered. Use of parcelling in this instance would lead to misspecification of items as  
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18 well as a misleading model fit.  
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21 [4] The removal of factor 2, *Emotional Detachment*, for women worsened the model fit.  
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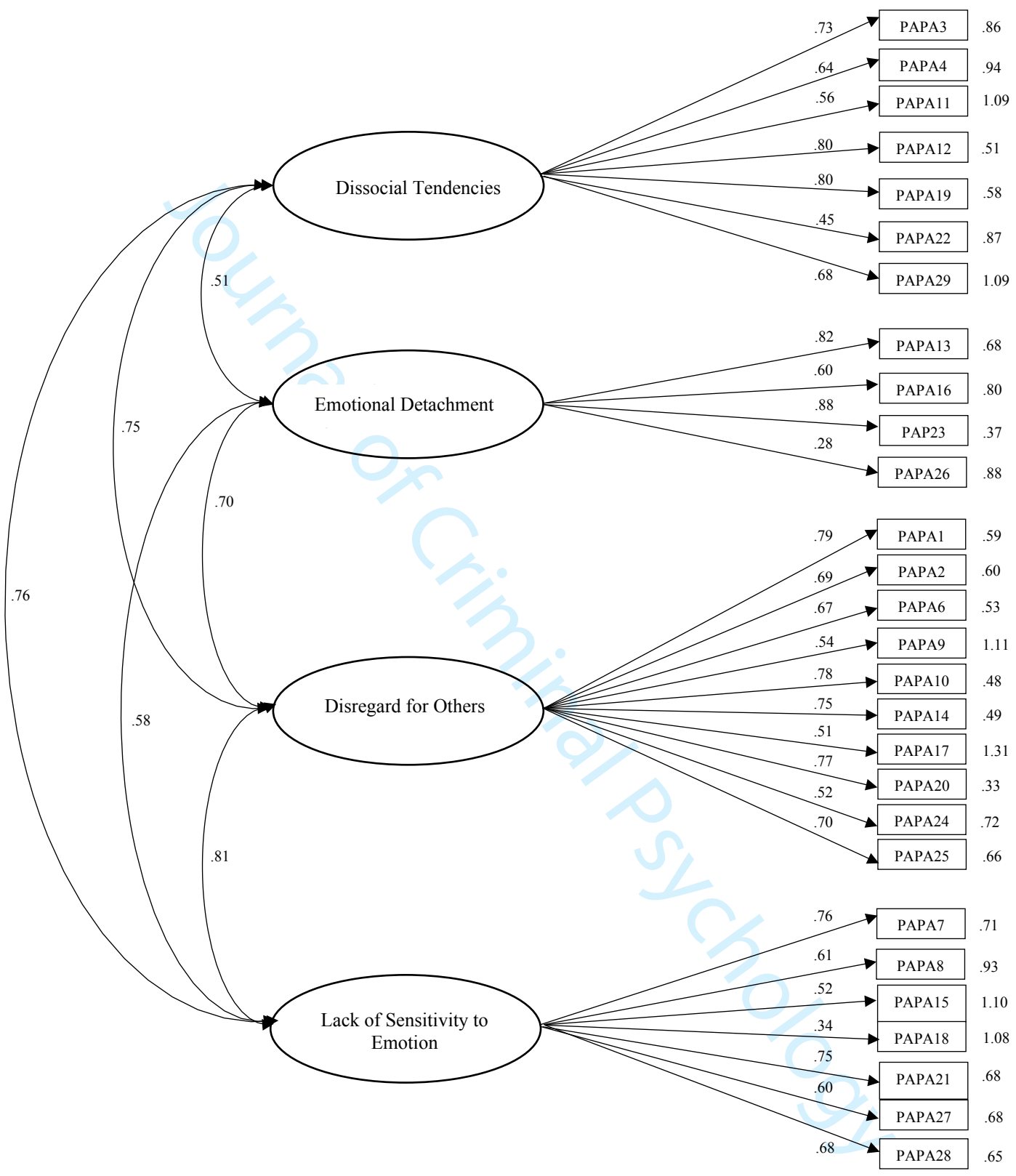


Figure 1. Confirmatory factor analysis of the PAPA factor structure outlined by Lewis et al. (2017) using a community sample (n = 692: STUDY I: RMSEA = .07; GFI = .85; CFI = .79; ECVI = 2.55).

Table 1. Exploratory factor analysis of the PAPA for men and women ( $n = 676$ ; Study II) (NB: Factor loadings are rounded to two decimal places).

	Original PAPA factor	Factor loading
<b>Factor 1 (24.6% variance), Disregard for Others; 7 items <math>\alpha = .76</math>, 6 items <math>\alpha = .77^a</math></b>		
I will use people to get what I want (PAPA 2)	Disregard for others	.71
I often find myself thinking that I am more important than others (PAPA 25)	Disregard for others	.68
I find most people are weak and not worth bothering with (PAPA 10)	Disregard for others	.58
I am only interested in myself (PAPA 1)	Disregard for others	.57
I can often find myself viewing others as nothing more than 'objects' or things to be used (PAPA 20)	Disregard for others	.57
If I am caught out on a lie I can quickly think of a way out (PAPA 17)	Disregard for others	.55
<b>I regularly view others as lazy (PAPA 9)</b>	<b>Disregard for others</b>	<b>.42</b>
<b>Factor 2 (8.2% variance), Emotional Detachment; 5 items <math>\alpha = .78^a</math></b>		
I find it difficult to give emotional and personal support to others (PAPA 23)	Emotional detachment	.80
I find it difficult to comfort others when they are upset (PAPA 13)	Emotional detachment	.80
I often feel in touch with other people's feelings [reversed] (PAPA 16)	Emotional detachment	.66
I often experience strong positive emotions, such as happiness and joy [reversed] (PAPA 18)	Lack of sensitivity to emotion	.60
I am not that bothered about others (PAPA 14)	Disregard for others	.52
<b>Factor 3 (6.4% variance), Dissocial Tendencies; 6 items <math>\alpha = .76^a</math></b>		
I often get into trouble more than others (PAPA 12)	Dissocial tendencies	.75
I am able to commit a wide number of behaviours that, if caught, would get me into trouble (PAPA 19)	Dissocial tendencies	.63
As a child, I often got into trouble more than others (PAPA 29)	Dissocial tendencies	.62
I don't think of the consequences of my actions (PAPA 4)	Dissocial tendencies	.61
I often take chances that could be risky to me or others (PAPA 3)	Dissocial tendencies	.56
I use illegal drugs, or those that are not prescribed to me, more than most people I know (PAPA 22)	Dissocial tendencies	.56
<b>Factor 4 (5.5% variance), Responsivity to Perceived Aggression; 6 items <math>\alpha = .73^a</math></b>		

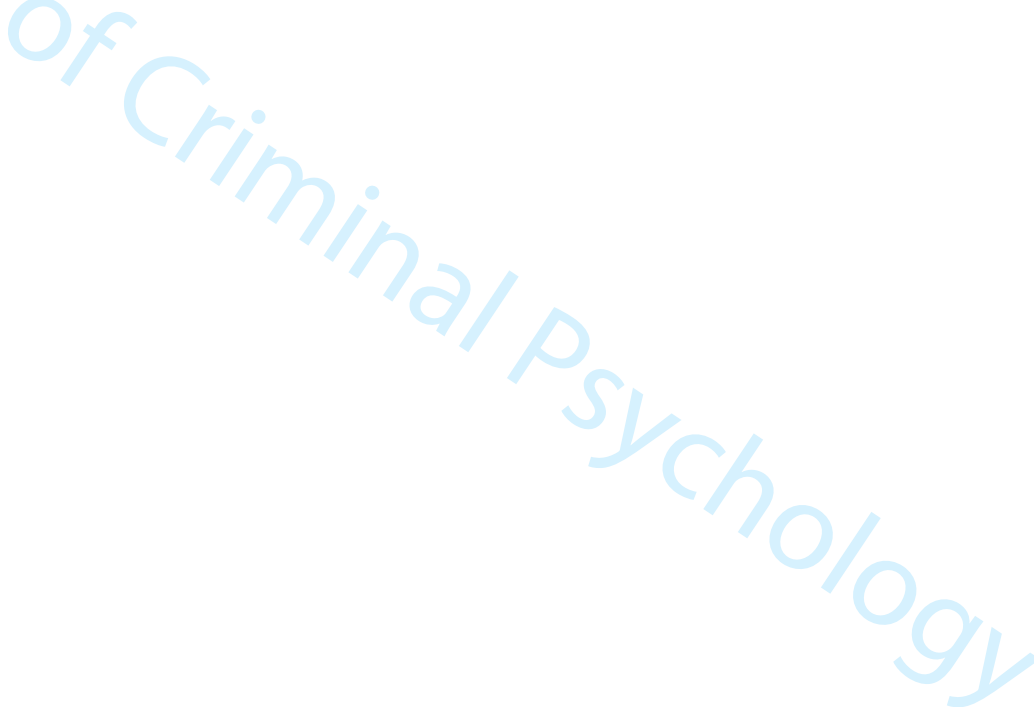
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Others would describe me as an irritable person with problems controlling my temper (PAPA 7)	Lack of sensitivity to emotion	.69
I am an aggressive person in a number of situations (PAPA 21)	Lack of sensitivity to emotion	.64
I often find people behave aggressively or in a hostile manner towards me (PAPA 27)	Lack of sensitivity to emotion	.60
I see a lot of hostility around me (PAPA 8)	Lack of sensitivity to emotion	.56
The world is a threatening place, you have to 'watch your back' (PAPA 15)	Lack of sensitivity to emotion	.55
Others would describe me as a very intense person who has difficulty getting on with others (PAPA 28)	Lack of sensitivity to emotion	.54

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Items in **bold** are least likely to form part of the specific factor with loadings below .50.

<sup>a</sup> All item-to-total correlations were positive.



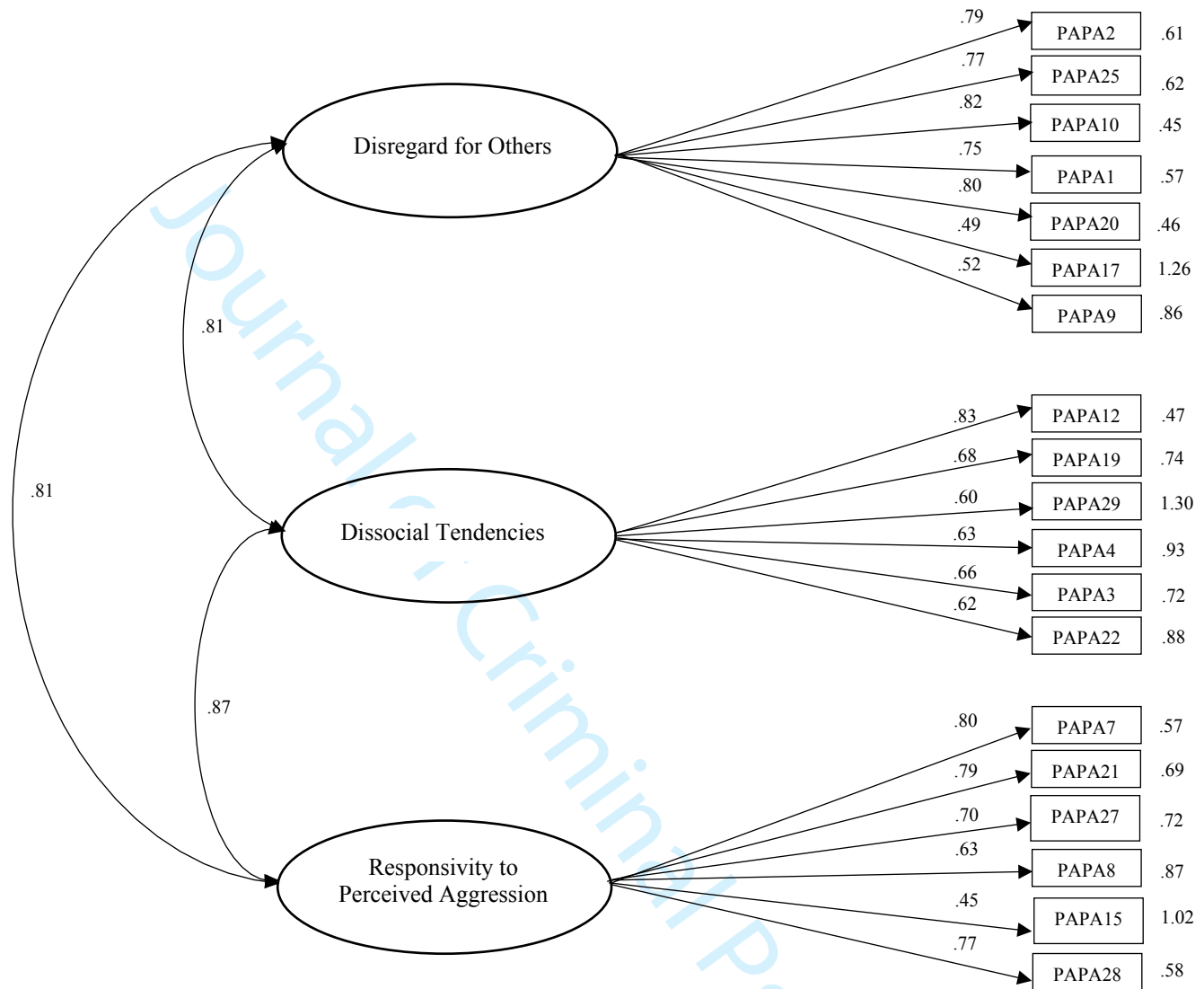


Figure 2. Confirmatory factor analysis of the revised PAPA factor structure among a community sample of men ( $n = 189$ ; STUDY III: RMSEA = .071; GFI = .86; CFI = .90; ECVI = 1.98).

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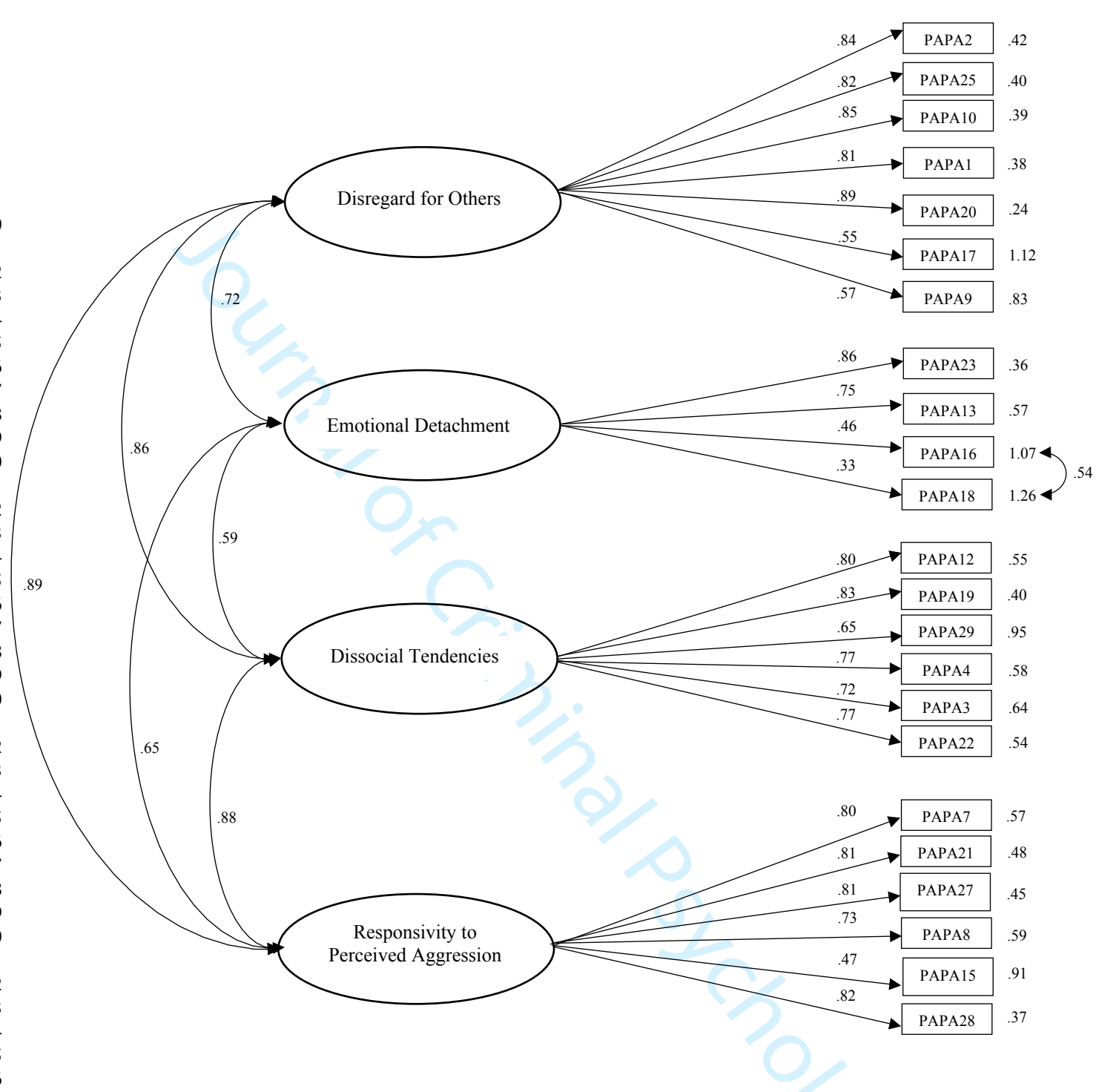


Figure 3. Confirmatory factor analysis of the revised PAPA factor structure among a community sample of women (n = 242: STUDY III: RMSEA = .076; GFI = .83; CFI = .91; ECVI = 2.65).