Facial Affect Processing in Violent Offenders: A Comparison of Intimate Partner

Violent and Generally Violent Men

by

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Abstract

This thesis explores facial affect processing in violent offenders, with a specific focus on how patterns of impairment seen in Intimate Partner Violent (IPV) prisoners differ to those of other violent prisoners. Chapter one introduces IPV as a serious public health concern with inadequate treatment efficacy. It discusses the overlap between IPV and non-IPV violence and highlights the need for further research elucidating how the treatment needs of IPV prisoners differ to those of non-IPV prisoners. The role of facial affect processing is then discussed in relation to empathy and violent offending. Chapter two reviews the literature on facial affect processing in violent offenders. The review found deficits in violent offenders' recognition of negative affect, with deficits in fear, anger and disgust most reliably reported, across indices of accuracy, sensitivity and response bias. Subtleties in processing patterns were observed between violent offenders and non-violent offenders, and between violent offenders and sexually-violent offenders. The review highlighted a dearth of research exploring facial affect processing in IPV prisoners. Chapter three presents a study investigating facial affect processing among IPV and non-IPV violent prisoners and non-offending controls. It investigated the role of eye-scan paths as a mechanism underpinning recognition deficits in violent offenders and explored the influence of psychopathology on visual scanning behaviour. Groups did not differ in their recognition accuracy but they did differ in their eye-scan paths as a function of intensity and sex of the expression; with non-offenders demonstrating different visual scanning behaviour relative to offender groups, who did not differ from each other. There was little evidence to suggest that eye-scan paths were influenced by psychopathological profiles of the groups. Chapter four presents a critique of the revised Conflict Tactics Scales (CTS2, Straus, Hamby, Boney-McCoy & Sugarman,

1996), a widely used measure of IPV. The review highlights the objectivity of the measure as both a strength, in terms of its limiting denial, minimisation and cognitive distortions but also a limitation in its failure to take into consideration the context in which the behaviour occurred. The scales' psychometric properties are also discussed. The thesis conclusions are presented in Chapter five, alongside recommendations for practice and research.

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Chapter One

Introduction

This chapter critically reviews literature on Intimate Partner Violence (IPV) and considers its similarities and differences to other forms of violence. There follows a discussion about the effectiveness of current approaches to the treatment of IPV. The role of empathy in violent offending is then outlined and discussed in relation to facial affect recognition deficits, the main research theme in this thesis. This chapter closes with a brief section on the importance of attentional deployment in facial affect recognition.

Intimate Partner Violence

Straus and Gelles famously coined "the marriage license as a hitting license" following the discovery that violence between intimates is perpetrated at a far more frequent rate than violence occurring outside the context of an intimate relationship (Straus & Gelles, 1986). Intimate Partner Violence, referring to physical violence, sexual violence, stalking and psychological aggression by a current or former intimate partner (e.g., Breiding, Basile, Smith, Black & Mahendra, 2015), was first brought to public attention in the 1970s (see Dobash & Dobash, 1979), and in the ensuing years it has emerged as a serious public health concern (Cohen, Schulz, Liu, Halassa, Waldinger, 2015).

To demonstrate the scale of the problem, in the year 2014-2015 there were an estimated 1.3 million female victims and 600,000 male victims of IPV in England and Wales (Office for National Statistics, February 2015), with prosecutions for IPV rising 19% from the preceding year (Ending Violence Against Women and Girls Strategy, March 2016). Moreover, IPV has a higher rate of repeat victimisation than any other crime (Home Office, July 2002). Although both sexes sustain injuries from IPV, male-female perpetrated IPV is proposed to do more serious damage than same-sex or female-male perpetrated IPV due to the imbalance in size and strength (Archer, 2000; Cascardi, Langhinrichsen & Vivian, 1992;

Dobash & Dobash, 2004; Felson, 2006; Stets & Straus, 1990). Perhaps the most poignant statistic of this nature is that, in the UK, two women are killed each week by a current or former partner (Office for National Statistics, February 2015), making IPV the primary cause of violent death among females (Fox & Zawitz, 2007).

The consequences of IPV are well-documented, with deleterious effects recognized for all family members, including the intergenerational transmission of violence (e.g., Black, Sussman & Unger, 2010; Carter, Weithorn & Behrman, 1999; Smith, Ireland, Park, Elwyn & Thornberry, 2011; Stover, Meadows & Kaufman, 2009). IPV victimisation is linked with increased risk for posttraumatic stress disorder (PTSD), depression, substance misuse and physical health problems in female victims (Campbell & Lewandowski, 1997; Cascardi et al., 1992; Coker, Smith, Bethea, King & McKeown, 2000). IPV also brings great financial costs to society and was estimated to have cost the British economy £16 billion in 2008 (Walby, 2009).

Due to the scale of problem, IPV has repeatedly been identified as an issue of grave concern necessitating improved services (Guy, Feinstein & Griffiths, 2014). Worryingly, reviews exploring the efficacy of IPV treatment have generally concluded that recidivism rates among treated IPV perpetrators are not significantly different to those of non-treated perpetrators (Arias, Arce & Vilariño, 2013; Babcock, Green & Robie, 2004; Eckhardt et al., 2013; Feder & Wilson, 2005; Klein, 2009; Miller, Drake & Nafziger, 2013; Stover et al., 2009). For instance, a review by Rosenfeld (1992) found recidivism rates were 36% for treated perpetrators in comparison to 39% for non-treated perpetrators, leading some to conclude that there is little convincing evidence to suggest benefits of IPV treatment extend beyond those of arrest (Maxwell & Robinson, 2014; Stover et al., 2009). In contrast, more

positive findings have emerged from the general violence literature (see Jolliffe & Farrington, 2007), with one study, for instance, finding that high-risk violent offenders treated using cognitive-behavioural techniques were 31% less likely to re-offend relative to their non-treated counterparts (Polaschek, Wilson, Townsend & Daly, 2005).

Conceptualisation of IPV

There has been much debate about how IPV is best conceptualised (Dixon & Graham-Kevan, 2011). While scholars tend to agree that individuals who perpetrate IPV are different from one another (e.g., Holtzworth-Stuart & Munroe, 1994; Johnson 1995), there is less consensus about whether IPV perpetrators are different to perpetrators of other types of crime. This debate is driven by two schools of thought: (a) that IPV is a unique behaviour, unrelated to other forms of violence and crime; and (b) that IPV cannot be distinguished from other types of violent behaviour (Herrero, Torres, Fernández-Suárez & Rodríguez-Díaz, 2016).

When IPV first emerged in the realm of academia, some 40 years ago, it was interpreted through theories that centred on the role of gender (Dobash & Dobash, 1979). A gender perspective maintains that men's violence towards women has its roots in sexism and patriarchy, and that societal rules and beliefs promote male dominance and female submission (e.g., Pence & Paymar, 1993). Thus, from a gender perspective, IPV is a unique form of violence perpetrated by men to gain control and power over women (Bell & Naugle, 2008; Dixon & Graham-Kevan, 2011).

Early conceptualizations of IPV as a special form of violence have been influential in the development of specialist research and practice in response to IPV (Dixon & Graham-

Kevan, 2011; Graham-Kevan, 2007). To this day, such perspectives prevail in driving practice-led initiatives, despite a wealth of evidence disproving the exclusivity of this perspective (Dixon & Graham-Kevan, 2011; Graham-Kevan, 2007; Ehrensaft, 2008). The evidence includes; the prevalence of female-perpetrated IPV occurring outside the context of self-defence or reciprocal violence (e.g., Dobash & Dobash, 2004); that male-perpetrated IPV occurs at similar rates in heterosexual and homosexual relationships (e.g., Tjaden & Thoennes, 2000); and that a substantial proportion of IPV perpetrators also perpetrate non-IPV violence (e.g., Marvell & Moody, 1999). Such findings suggest that male dominance and male sexist attitudes are insufficient as an explanation for IPV.

In his often cited paper, Johnson (1995) argued that data may not conclusively support gendered-based perspectives due to inconsistencies in the populations under investigation. Specifically, Johnson (1995) argued that studying female victims of IPV residing in shelters, as gender-theorists often do, is likely to study a different phenomenon to research utilising representative community samples. In efforts to make sense of the disparate views, Johnson (1995) proposed that there are two distinct forms of IPV, and that patriarchal traditions of men's right to control women are implicated in only one of these. According to Johnson (1995), this IPV perpetration (initially labelled 'patriarchal terrorism' but later re-coined 'intimate terrorism') is of greater severity, frequency and unilaterality than 'common couple violence' (later renamed as 'situational couple violence', Johnson, 1999). 'Common couple violence' conceptualises violence that typically occurs following conflict rather than deliberate intent to control one's partner, and can be perpetrated by one or both members of the dyad. Johnson (1995) believed that it was this latter form of relatively 'minor' IPV

perpetration that is captured in studies that reveal similar rates of IPV perpetration among males and females (e.g., O'Leary et al., 1989).

While Felson (2006) acknowledged Johnson's (1995) efforts to reach a compromise, he did not subscribe to his proposals. Felson (2006) did not dispute the construct of 'intimate terrorism' as involving more severe, frequent and unilateral IPV, but he argued that perpetrators of this form of IPV "may be nasty brutes, not domineering sexists" (p. 23). Indeed, research carried out since Johnson's classification has not found support for sex differences in 'intimate terrorism', rather finding that the use of controlling aggression is at least equally characteristic of women, perhaps more so (e.g., Bates, Graham-Kevan & Archer, 2014; Graham-Kevan & Archer, 2003a; 2003b; 2009), and that principles of control also predict same-sex aggression (Bates et al., 2014). Felson (2006) further noted that traditional gender roles actually prohibit violence against women and promote chivalry, thereby contradicting the role of patriarchal cultural values in IPV.

With the above in mind, Felson (2006) proposed the "violence perspective" for explaining IPV. The violence perspective focuses on the similarities between IPV and other forms of violence, including similarities in the motives, etiology, correlates, and risk factors. Scholars who subscribe to this perspective postulate that partners are 'convenient targets' for violence perpetration and that an individual is similarly likely to perpetrate violence outside an intimate relationship should circumstances present themselves (Felson & Lane, 2010; Sorensen, Vigen, Woods & Williams, 2015). Proponents of this perspective therefore maintain that IPV can be explained by general theories of violence and crime (e.g., Felson, 2006; 2010; Dutton, 2010, 2012).

In recent years, some well-designed studies have been conducted which allow for the testing between the competing perspectives. Findings of differences between IPV and general violence lend support to IPV as a distinct form of violence, while research finding similarities is viewed as support for the violence perspective; some such findings are summarised below.

Similarities in IPV and general (non-IPV) violence

In investigating the additive and interactive effects of gender and the victim-offender relationship on the criminal history of homicide perpetrators, Felson and Messner (1998) found that the violence history of men and women who had killed their partners did not differ from men and women who had killed other victims. This finding does not fit with the gendered perspective, which would explain female partner homicide from the standpoint of self-defence and thus would not predict similarities with female non-IPV violence (Felson & Lane, 2010).

Using a similar methodology to Felson and Messner (1998), Felson and Lane (2010) examined prior criminal records, substance use and abuse victimisation of IPV and non-IPV violent men. The authors found little evidence to suggest that IPV offenders were different to other violent offenders. In particular, both groups of offenders were equally likely to have been intoxicated at the time of assault (although, notably, Felson, Burchfield & Teasdale, 2007, found that IPV offenders were less likely to be intoxicated at time of assault than were offenders who had assaulted a stranger), to have alcohol problems, prior abuse victimisation, and historical records of violence. Felson and Lane (2010) did find, however, that IPV offenders were less likely to have histories of non-violent offences or drug histories than those who offended against strangers. Thus, the authors concluded that while their results generally support the notion that IPV offenders were typical violent offenders, some

important differences were found between the two, particularly with regard to criminal versatility. This latter finding is inconsistent with that of Thomas, Dichter and Matejkowski (2011) who found similarities in the non-violent offence histories of IPV and non-IPV homicide perpetrators.

In exploring dating violence among university students using the revised Conflict Tactics Scales (CTS2; Straus et al., 1996), Straus and Ramirez (2004) found that undergraduates with criminal histories were at increased risk of IPV perpetration than those without criminal histories. Similar findings of a link between IPV, antisocial behaviour and violence have emerged from longitudinal research (e.g., Herrenkohl, Kosterman, Mason & Hawkins, 2007; Lussier, Farrington & Moffitt, 2009), and pose a challenge to proposals that IPV has a special etiology. Indeed, reviews of the literature have found that a number of factors associated with increased risk for IPV perpetration are also established risk factors for general violence, including family of origin violence, substance use and antisocial behaviour (Capaldi, Knoble, Shortt & Kim, 2012; Stith, Smith, Penn, Ward & Tritt, 2004).

In a longitudinal study, Piquero, Theobald & Farrington (2014) explored the overlap between offending trajectories, general violence and IPV in a cohort of males followed until the age of 50, as well as the factors associated with criminal behaviour. IPV perpetration was assessed using the CTS and data from official conviction records was used to measure offending trajectories. The authors found that offence frequency predicted both general violence and IPV and that childhood risk factors had no effect on violence perpetration after accounting for the individual's longitudinal offending trajectory. On the basis of their findings, Piquero and colleagues concluded that IPV-specific policy and intervention may be

unfounded and that initiatives should instead focus on reducing criminal behaviour more generally.

Differences between IPV and general violence

Perhaps the most influential research examining the extent to which IPV and general crime are similar phenomena came through the longitudinal work of Moffitt and colleagues. Moffitt Krueger, Caspi and Fagan (2000) investigated correlates of IPV and general crime in a cohort of over 800 adults using personality data collected at age 18 and offending behaviour assessed at age 21. Through modelling latent constructs underlying indicators of IPV and general crime, they found that the two forms of offending were different constructs that were moderately related. Specifically, they found that, although many IPV individuals also perpetrated non-IPV violence, the etiology of the violence differed, as suggested by different correlates. For example, general crime was related to low self-control but IPV was not; while both general crime and IPV shared a tendency toward negative emotionality. The authors concluded that IPV and general crime "are not merely two expressions of the same underlying antisocial propensity" and that they are not conceptually comparable, even if carried out by the same person (p. 199, Moffitt et al., 2000). While the findings of Moffitt and colleagues support theoretical arguments for IPV as a distinct and unique form of criminal behaviour, the authors did not distinguish between violent and non-violent offending, studying the two collectively as "general crime". Consequently, it does not offer insights into the extent to which the etiology of IPV is distinct from non-IPV violence.

In comparing socio-demographic, legal, family, clinical and situational characteristics of IPV versus non-IPV homicide, Thomas et al. (2011) found that IPV men evidenced less antisocial behaviour in childhood and were more likely to have been diagnosed with mental

illness than were non-IPV men. Moreover, the authors concluded that IPV men were more conventional in terms of their social and employment histories than were non-IPV men.

Other differences between IPV and non-IPV violence include that a unique set of relational risk factors are implicated in IPV; including relationship discord, jealousy and attachment (Capaldi et al., 2012; Stith et al., 2004). Furthermore, victims of IPV are more often injured compared to victims of other violence (51% injury rates for IPV and 39% for non-IPV); although weapon use is less common in IPV (used in 12% of IPV incidents compared to 20% of non-IPV incidents) (Statistics Canada, 2005). IPV can also be distinguished from non-IPV violence based on its ongoing nature. Specifically, IPV typically consists of a number of incidents of violence within the relationship as compared to a single act of violence that is commonly perpetrated against a friend, acquaintance or stranger (Hanmer, Griffiths, & Jerwood, 1999; Ogrodnik, 2006). These unique factors surrounding IPV lend support to proposals that IPV is a special form of violence.

Current treatment approaches to IPV

The preceding literature demonstrates that there are indeed risk factors which are unique to IPV and others which are specific to non-IPV violence, but that there is also a considerable degree of overlap between the two types of violent offending. This conceptual similarity has tended to be overlooked in practice. For example, in the UK prison service, IPV offenders receive a different treatment pathway to other violent offenders and are referred to treatment programmes developed specifically to treat this form of violence (such as Building Better Relationships and the Healthy Relationships Programme). The financial implication of specialised treatment pathways is clear and is governed by the assumption that

IPV is distinct from violence perpetrated toward non-intimates. However, as highlighted, research does not conclusively support this assertion.

The inadequate efficacy of IPV-specific treatment, which is not paralleled in the treatment of general violence, together with evidence of an overlap in the treatment needs of IPV and non-IPV violent offenders, an ever-increasing number of offenders mandated to custodial treatment and yet finite resources, has led to proposals that there may be value in moving away from divergent treatment pathways towards an integrated approach to treatment (e.g., Fagan & Browne, 1994; Piquero et al., 2014). This approach could target risk factors common to both forms of violence, followed by specialised modules targeting the factors that differentiate the two forms of violence (e.g., Fagan & Browne, 1994; Klevens, Simon & Chen, 2012; Piquero et al., 2014; Thomas et al., 2011). Nonetheless, a greater understanding of the treatment needs of IPV offenders, and how these differ to non-IPV violent offenders, is warranted in order for such attempts to be successful in reducing recidivism.

Of the myriad of individual factors studied in relation to violent behaviour, an important consideration yet to be adequately paralleled in the realm of IPV is that of empathy.

Empathy in violent offending

Empathy, "broadly defined as a set of constructs having to do with the responses of one individual to the experiences of another" (Davis, 1996 p.12), is understood to be both a motivator of prosocial behaviour (Eisenberg, 2000; Moore, 1990) and an inhibitor of harmful behaviour (Feshbach & Feshback, 1982; Miller & Eisenberg, 1988). It is perhaps not surprising, then, that for many years scholars have been interested in the role of empathy in

offending, where a void in empathy is often seen. Indeed, meta-analyses have found impoverished empathic capacity to be associated with aggression (Miller & Eisenberg, 1988) and violent offending (Jolliffe & Farrington, 2004; van Langen, Wissink, van Vugt & Stams, 2014).

In an early paper examining personality characteristics of IPV men, Hastings and Hamberger (1988) remarked that "Batterers tend to think and feel only in terms of their own needs and emotions, with little regard for those of others" (p. 44). Ironically, this tendency to focus on the emotional experience of the perpetrator has been paralleled in IPV research, with emotional difficulties in IPV abusers well-documented (see Dutton, 2008; Finkel, 2007) and comparatively little attention being paid to IPV perpetrators' ability to understand the emotional experience of others'; a skill which is heavily implicated in models of empathy (e.g., Marshall, Hudson, Jones & Fernandez, 1995). Indeed, in their meta-analytic review of risk factors for IPV, Stith and colleagues identified empathy as an area requiring further research (Stith et al., 2004).

Crucially, there is evidence to suggest that developing empathic capacity may serve as a catalyst for change in IPV and thus that empathy could represent an important treatment target. Specifically, in investigating men who had desisted from IPV, Scott and Wolfe (2000) found that developing empathy for their partner was the most highly endorsed treatment variable related to change (endorsed by 89% of men). This is consistent with the general violence literature, whereby studies have revealed a link between improved empathic capacity and reduced violent behaviour (e.g., Dadds, Cauchi, Wimalaweera, Hawes & Brennan, 2012; Eisenberg & Fabes, 1990; Feshback, 1978; Hubble, Bowen, Moore & van Goozen, 2015; Penton-Voak et al., 2013).

Although there is some disagreement among scholars about the precise components of empathy (see Day, Casey & Gerace, 2010; Gery, Miljkovitch, Berthoz & Soussignan, 2009), most acknowledge it as a multifaceted phenomenon and highlight the role of emotional decoding early on in a sequential process (Davis, 1983; Gery et al., 2009; Marshall et al., 1995; Marshall & Marshall, 2011). Perhaps the most persuasive model of empathy is that of Marshall et al. (1995) who highlight that empathic responding entails the achievement of the following steps: (1) emotional recognition (i.e., decoding the emotional signals of others); (2) perspective-taking (i.e., understanding others' thoughts and feelings); (3) emotion replication (i.e., generating appropriate emotion in oneself); and (4) response (i.e., enacting an appropriate response). Marshall et al.'s (1995) model views emotion recognition as critical to achieving subsequent stages, and thus as a necessary precursor to empathy. As such, deficits in emotion recognition are theorised to drive cascading problems in empathy (Dadds et al., 2014) and to play a facilitating role in offending due to impoverished ability to recognise and understand a victim's distress (Blair, 2001; Farrington, 1998; Gery et al., 2009; Kirsch & Becker, 2007).

In the socio-cognitive literature, facial expressions are conceived as a primary channel of emotional communication (Clements & Schaumacher, 2010; Craig, 2009; Hess, Kappas & Scherer, 1988), providing a universal language for transmitting information about emotional experience (e.g., Ekman, 1972; Niedenthal & Brauer, 2012). This understanding has stimulated research interest into whether impoverished facial affect recognition is an obstacle for achieving empathy among violent offenders.

Indeed, research has found facial affect recognition deficits in aggressive and violent samples, particularly in the recognition of fear (e.g., Gery et al., 2009; Gillespie, Rotshtein,

Satherley, Beech & Mitchell, 2015; Hoaken, Allaby & Earle, 2007; Hudson et al, 1993; Marsh & Blair, 2008; Robinson et al., 2012; Seidel et al., 2013), and that recognition impairments are linked to impoverished empathy (e.g., Carr & Lutjemeier, 2005; Gery et al. 2009; Romero-Martínez, Lila, Martínez, Pedrón-Rico & Moya-Albiol, 2016). Moreover, facial affect recognition training has been found to reduce aggressive behaviour in violent samples (Dadds, Cauchi et al., 2012; Hubble et al., 2015; Penton-Voak et al., 2013). Together, such findings underscore the importance of facial affect recognition deficits in facilitating violent behaviour, conceivably through their role in impeding empathy.

Emotion recognition in IPV

The possibility that IPV perpetrators may have difficulty in interpreting their partner's affective displays was first suggested by Holtzworth-Munroe and Smutzler (1996) following the discovery that IPV men often respond to their partner's emotional displays with hostility. In particular, Holtzworth-Munroe and Smutzler (1996) found that, relative to non-IPV men, IPV men were less likely to report prosocial emotion to a range of their wives' hypothetical behaviours (including verbal aggression, complaints about the relationship and herself, as well as neutral and positive statements) and were more likely to report anger, irritation, and aggressive behavioural intentions. Studies have also shown that IPV men react in a hostile manner to emotional displays of their partner's distress (Jacobson et al., 1994; Ross, 2007) and even neutral affect (Burman, Margolin, John, 1993).

Indeed, there is evidence to suggest that, relative to non-violent controls, IPV men have difficulty decoding the thoughts and feelings of others during interactions, including those of their partner (e.g., Clements, Holtzworth-Munroe, Schweinle & Ickes, 2007), and

research has shown such deficits to be linked to IPV frequency (Covell, Huss & Langhinrichsen-Rohling, 2007).

A series of studies conducted by Romero-Martínez and colleagues using the 'Eyes Test' (Baron-Cohen, Wheelright, Hill, Raste & Plumb, 2001) suggest that deficits in decoding facial displays of emotion may contribute to IPV perpetrators' problems in understanding and thus in appropriately responding to emotional displays, particularly neutral displays (Romero-Martínez, Lila & Moya-Albiol, 2016; Romero-Martínez, Lila, Catalá-Miñana, Williams, & Moya-Albiol, 2013; Romero-Martínez, Lila, Sariñana-González, González-Bono, & Moya-Albiol, 2013). Indeed, misreading a partner's emotion, particularly incorrectly attributing hostility, could trigger IPV perpetration (Cohen et al., 2015; Crick & Dodge, 1996; Dodge & Cole, 1987). However, these findings are limited by the presentation of just the eyes in the 'Eyes Test' and thus are arguably not a true reflection of IPV men's facial affect recognition abilities. Nonetheless, studies examining recognition abilities using entire facial configurations of the six basic expressions have also found evidence of impaired facial affect recognition among IPV men relative to non-violent controls, including in the recognition of disgust, fear, happiness and neutrality (Babcock, Green & Webb, 2008; Marshall & Holtzworth-Munroe, 2010). Moreover, these latter studies have shown that deficits observed vary according to IPV perpetrators' level of psychopathology; particularly their psychopathic and borderline traits (dimensions commonly used to characterise IPV perpetrators; e.g., Holtzworth-Munroe, Meehan, Herron, Rehman & Stuart, 2000; Holzworth-Munroe & Stuart, 1994).

Although there is evidence to suggest impoverished facial affect recognition abilities in IPV men, and that this may link to personality pathology that is characteristic of IPV

perpetrators, no studies have examined the extent to which similar social-cognitive impairments are seen in a non-IPV violent comparison group. Consequently, it is not possible to determine to what extent the impairments are due to psychopathology or antisociality as opposed to IPV perpetration specifically. A greater understanding of facial affect recognition impairments in IPV relative to non-IPV violent offenders, as well as how this may relate to different psychopathological profiles of the offenders, would help to facilitate understanding of how recognition deficits may increase an individual's risk of different forms of violence perpetration.

Furthermore, to date, studies in this field have utilised volunteering samples of perpetrators (Babcock et al., 2008; Marshall & Holtzworth-Munroe, 2010) or men sentenced to mandatory community treatment programmes (Romero-Martínez, Lila, Catalá-Miñana, et al., 2013; Romero-Martínez, Lila, Martínez et al., 2016; Romero-Martínez, Lila & Moya-Albiol, 2016; Romero-Martínez, Lila, Sariñana-González et al., 2013). Findings emanating from such research are not wholly generalizable to samples of perpetrators mandated to treatment in custody; who have typically perpetrated more severe forms of IPV (Babcock et al., 2008; Pascual-Leone, Bierman, Arnold & Stasiak, 2011). Given that severe IPV perpetration may be linked to a different constellation of risk factors to that associated with more minor forms of IPV (e.g., Pan, Neidig, O'Leary, 1994; Pascual-Leone et al., 2011; Slep, Foran, Heyman & Snarr, 2015), and evidence for a raised delinquent and psychopathological profile in a prison sample of IPV perpetrators relative to a community sample of perpetrators (García-Jiménez, Godoy-Fernández, Llor-Esteban & Ruiz-Hernández, 2014), it is important that investigations of facial affect recognition are extended to IPV prisoners. Indeed,

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explicating the criminogenic needs of IPV prisoners is imperative if custodial treatment efforts are to be effective in reducing recidivism.

An illustrative example capturing the aforementioned issue of over-generalising community research findings comes from a recent Spanish study wherein the facial affect recognition abilities of IPV prisoners were compared to those of other types of prisoners (unfortunately, a lack of fully translated paper means that important details pertaining to sample composition are unknown to the present author) (Bueso-Izquierdo, Hidalgo-Ruzzante, Burneo-Garcés & Pérez-García, 2015). Surprisingly, Bueso-Izquierdo and colleagues found that the IPV group were better at recognising anger and surprise than were men convicted of other crimes. However, their study did not examine IPV relative to non-offending controls and thus it is unclear whether the enhanced recognition abilities of IPV prisoners were seen due to the impaired abilities of "other offenders", or whether emotion recognition abilities manifest differently among prison samples of IPV perpetrators (and thereby could also be seen relative to a non-offending control group). Indeed, these proposals are not mutually exclusive but they do highlight the need for further research comparing IPV, non-IPV offenders and non-offenders in the same study in order to explore the validity of these possibilities. The findings also raise important questions about the factors underpinning facial affect processing deficits in IPV perpetrators and indicate the need to move beyond the level of correlates to explorations of potential mechanisms driving this impairment.

Elucidating the processes underpinning facial affect processing deficits in violent offenders could contribute to the development of refined treatment strategies targeting the origin of emotion recognition deficits, and, as such, aid in the unravelling of empathy impairments (Hubble et al., 2015). Moreover, if similarities are observed in the mechanisms

underpinning recognition deficits in IPV and non-IPV violent offenders, then interventions targeting common processes could have a positive impact on reducing both forms of violence (Klevens et al., 2012). One such process that is heavily implicated in facial affect recognition is the orienting of visual attention when viewing emotional expressions.

Eye-scan paths

The role of visual attention in facial affect recognition makes intuitive sense and is supported by empirical research showing that the way in which an individual orients visual attention toward facial features can affect their ability to decode the emotional experience of the sender (e.g., Eisenbarth & Alphers, 2011; Pollux, Hall & Guo, 2014; Vaidya, Jin & Fellows, 2014).

Blais, Roy, Fiset, Arguin and Gosselin (2012) note that metaphorical language such as "*I could see it in her eyes*" and "*The eyes are the window to the soul*" articulate the role of the eyes in communicating emotional information. However, the eyes are not equally important for the recognition of different emotions. Rather, research has found the eyes to be the most information-rich feature for categorizing fearful and angry facial expressions, while the mouth is the more salient feature for decoding happiness and surprise (e.g., Schyns, Petro & Smith, 2007; Schyns, Petro & Smith, 2009; Smith, Cottrell, Gosselin & Schyns, 2005; van Rijsbergen & Schyns, 2009).

Consistent with this, underutilisation of the eye region has been found in populations demonstrating impaired fearful facial affect recognition, such as individuals with callous unemotional traits (Dadds, El Masry, Wimalaweera & Guastella, 2008; Gillespie, Rotshtein, Wells, Beech & Mitchell, 2015), amygdala damage (Adolphs et al., 2005) and social anxiety

(Horley, Williams, Gonsalvez, & Gordon, 2004; Moukheiber et al., 2010; Staugaard & Rosenberg, 2011).

The role of attention to salient features in facial affect categorisation is further underscored by research demonstrating the efficacy of priming participants who demonstrate impaired recognition to attend to emotionally-salient facial information in improving recognition accuracy (e.g., Adolphs et al., 2005; Dadds et al., 2006; Hubble et al., 2015; Schönenberg, Christian et al., 2014).

Together, the findings reviewed demonstrate a critical role of directing attention to salient facial features in facial affect decoding, and suggest a breakdown in directing attention to diagnostic facial regions among populations demonstrating impaired facial affect recognition (Dadds et al., 2006; 2008; Gillespie, Rotshtein, Wells et al., 2015). However, there is a dearth of research examining visual attention in violent samples. Indeed, the findings suggest a link between personality pathology and visual attention that could be highly relevant to understanding patterns of facial affect recognition deficits in IPV perpetrators, as well as how patterns of impairment may differ to those of other violent offenders (Gillespie, Rotshtein, Satherley et al., 2015).

Current thesis

The role of facial affect processing in IPV is yet to be adequately understood. Moreover, while proposals have been made about how emotion recognition deficits may play-out in the offence process, an understanding about the origins of such deficits remains unknown. With this in mind, this thesis aims to provide a comprehensive investigation of facial affect recognition in IPV offenders and to examine how this differs to that observed

among other violent offenders and control participants. This will be achieved via three pieces of work, each of which is presented as a chapter within the thesis.

First, in chapter two, a systematic review of the literature examining facial affect processing in violent offenders is presented. This shows that violent offenders have deficits across a number of indices of facial affect processing. Specifically, deficits were found across measures of sensitivity, accuracy and attribution biases. The review highlights that specific deficits observed vary according to sample composition, particularly pertaining to the study of sexual violent offenders, and reinforces the need to explore whether deficits present differently among IPV and non-IPV offenders. Next, chapter three presents a study comparing facial processing in IPV and non-IPV violent prisoners. The study focuses specifically on exploring the role of eye-scan paths when viewing emotional faces as a mechanism underpinning impoverished recognition abilities in violent offenders. Moreover, the study examines the influence of personality pathology on eye-scan paths. Elucidating facial affect processing deficits and the factors underpinning these has important implications in the development of training initiatives targeting emotion recognition and empathic responding in offenders. Chapter four provides a critique of the revised Conflict Tactics Scales (CTS2; Straus et al., 1996), a widely utilised tool for assessing violence perpetration in intimate relationships. The thesis conclusions are presented in chapter five. This final chapter draws together the work presented in this thesis and discusses the implications for further research and practice.

Chapter Two

Facial affect processing in incarcerated violent males: A systematic review

Abstract

Previous reviews exploring facial affect processing among forensic samples have focused on the presence of psychopathy and have not distinguished on the basis of offending. There is therefore a need for a review of facial affect processing among offenders. The principle aim of this review was to systematically explore facial affect processing in incarcerated violent offenders, without a focus on the presence of psychopathic personality traits. Two questions were explored in relation to this aim: (1) do violent offenders exhibit a different pattern of impairment to non-violent offenders; and (2) does the study of sexually-violent offenders impact upon patterns that are observed. Following a systematic search of electronic databases and subsequent manual search, eight studies were assessed as meeting inclusion criteria, of which seven obtained a quality score deemed acceptable for review. These studies examined recognition accuracy, sensitivity and response bias of seven emotion categories (including neutral) in incarcerated male offenders with a history of violence. The results supported proposals of impaired facial affect processing among violent offenders. Consistent with similar reviews in this field, the impairment was not generalised but specific to negative emotion, with deficits in fear, anger and disgust being most reliably reported. Moreover, violent offenders showed a bias towards perceiving anger in ambiguous stimuli containing proportions of an angry expression, but did not show increased accuracy for low intensities of anger, and were less likely to interpret a neutral face in prosocial ways in comparison to non-offenders. Although violent offenders tended to exhibit impairments over non-violent offenders, no consistent pattern of impairment was observed. The review found evidence to suggest that the exclusion of sex offenders from violent samples could affect whether deficits in recognition accuracy are observed in relation to controls, and studies which included sex

offenders were more likely to find deficits in disgust recognition. No studies compared a mixed sample of sexually-violent and violent offenders to non-violent offenders. Limitations and implications are discussed.

Introduction

Evidence suggests that there are six basic emotions that are universally recognised across cultures; anger, disgust, fear, happiness, sadness and surprise (Ekman, 1972, 1992a, 1992b, 1993; Ekman & Friesen, 1971; Elfenbein & Ambady, 2002). According to Keltner (2003) emotional expressions play a pivotal role in the formation and regulation of relationships; they provide information about the emotions and motives of the sender, they provoke a response in the receiver, and they provide motivation for desired social behaviour (Keltner, 2003). It is perhaps not surprising, then, that breakdowns in social and emotional responding occur when individuals are impaired in recognising others' facial displays of emotion (Gillespie, Rotshtein, Satherley et al., 2015). Indeed, impairments in decoding socio-emotional information, including facial affect, have been observed in a number of clinical conditions including anxiety disorder (Demenescu, Kortekaas, den Boer & Aleman, 2010; Easter et al., 2012), attention-deficit hyperactivity disorder (Rapport, Friedman, Tzelepis & Van Voorhis, 2002; Singh et al., 1998), autism (Gross, 2004), depression (Demenescu et al., 2010; Surguladze et al., 2004) and schizophrenia (Kohler & Brennan, 2004; Trémeau, 2006).

Socio-cognitive impairments have also been observed in antisocial populations, who exhibit difficulties responding to social rules (Gillespie, Rotshtein, Satherley et al., 2015; Loney, Frick, Clements, Ellis & Kerlin, 2003). Blair (2001) postulated that aggressive behaviour in antisocial populations may be related to problems in identifying and responding to social cues, particularly distress cues, such as fear and sadness. In particular, it is believed

that accurate decoding of distress cues is required for evoking affective responses in the decoder, such as empathy and remorse, that serve to mitigate the likelihood of aggression against the sender (Blair, 2001; Marsh & Ambady, 2007; Marsh & Blair, 2008). Indeed, in their meta-analysis exploring facial affect recognition in antisocial populations, Marsh and Blair (2008) found that individuals who show instrumental aggression have specific deficits pertaining to the recognition of fearful, sad, and surprised expressions. Moreover, the impairment in fear recognition was significantly worse than impairments for sad and surprised expressions.

Antisocial behaviour, broadly defined, includes aggressive, criminal, and externalising behaviours, and abusive conduct (Marsh & Blair, 2008). It incorporates aggressive and forceful contact with a victim (i.e., violent behaviour), as well as behaviours that do not involve such contact. Given that breath of definition, it is reasonable to propose that there may be fundamentally different cognitive mechanisms mediating different subtypes of antisocial behaviour (Gillespie, Rotshtein, Satherley et al., 2015). Indeed, the relative influence of different etiological factors differs depending on the subtype of antisocial behaviour (Leist & Dadds, 2009), and different etiological factors have been found to be implicated in violent and non-violent behaviour. For example, risk factors for violence include the presence of violent attitudes and affective instability, whilst these factors are of lesser importance in predicting non-violent offences (e.g., fraud). With this in mind, more recent research has explored facial affect recognition deficits associated with specific types of antisocial behaviour. This research has provided insight into whether, and, indeed, how patterns of socio-cognitive impairment differ between violent and non-violent antisocial behaviour.

A vast amount of this research has utilised prison samples, due to the accessibility of individuals demonstrating violent and non-violent antisocial behaviour within incarcerated populations. However, methodological variation makes comparisons across studies difficult. For example, some studies have examined violent offenders relative to non-violent offenders and others relative to non-offenders. For studies that make use of the latter design, it is unclear whether the observed impairments are specific to violent behaviour or are associated with rule-breaking behaviour more generally. Moreover, there is a lack of consistency in methodological design with regard to the inclusion of sexual offenders, with some studies including sexual offenders in their sample of violent offenders, some studying sexual offenders as a separate sample, and others altogether excluding sexual offenders from the sample. Given that a specific set of risk factors is implicated in sexual offending (such as self-regulation difficulties, sexual preoccupation and deviant sexual preferences; Hanson & Morton-Bourgon, 2005), it is reasonable to propose that differences could extend to socio-cognitive factors, and thus the inclusion and exclusion of sexual offenders may make comparisons across studies problematic. Indeed, research comparing samples of sex offenders to other violent offenders has indicated differences in facial affect recognition between the two types of offenders (Gillespie, Rotshtein, Satherley et al., 2015; Hudson et al., 1993).

Current review

While previous reviews have explored deficits in emotion recognition in antisocial and psychopathic populations (e.g., Dawel, O'Kearmey, McKone & Palemo, 2012; Marsh & Blair, 2008), including samples of offenders, such reviews have not analysed results as a function of offending status and/or have not distinguished on the basis of the type of offence.

A greater understanding of how patterns of impairment differ among subtypes of offenders is necessary in order to elucidate potential mechanisms driving the subtypes of antisocial behaviour, and thereby to better inform treatment approaches. The present review attempts to facilitate understanding by accessing the literature examining facial affect processing in violent offenders as compared to populations of non-violent offenders and/or non-offenders. The review also explores how the study of sexual offenders affects study outcomes.

Existing reviews

A scoping exercise to identify the likely volume of studies to be reviewed and any existing reviews was carried out in July 2015. The search was conducted using the Cochrane Library, EMBASE, MEDLINE, PsycINFO and Web of Science. Over 40 reviews of facial emotion recognition were identified. The majority of these papers reviewed emotion recognition in neuropsychiatric conditions (n = 33); four papers reviewed abilities in individuals with cognitive impairment (McCade, Savage & Naismith, 2012; Moore, 2001; Rojahn, Lederer & Tassé, 1995; Zaja & Rojahn, 2008); two reviewed abilities in Borderline Personality Disorder (BPD) (Domes, Schulze & Herpertz, 2009; Mitchell, Dickens & Picchioni, 2014); one reviewed alcoholic patients (Fortunata & de Lima Osório, 2014); and one reviewed abilities in maltreated children (da Silva Ferreira, Crippa & de Lima Osório, 2014). Of particular relevance to the current review, four papers reviewed facial affect processing in antisocial populations, which included samples of offenders. Two of those looked specifically at psychopathic populations (Brook, Briema & Kosson, 2013; Dawel et al., 2012), and two reviewed facial affect processing in antisocial and aggressive populations more generally (Marsh & Blair, 2008; Mellentin, Dervisevic, Stenager, Pilegaard & Kirk, 2015).

Reviews exploring facial affect processing in antisocial populations

In their meta-analysis, Marsh and Blair (2008) looked at children and adults with antisocial traits or behaviours and included participants displaying high levels of violence and/or aggression, of which an unreported proportion was prisoners. They investigated whether individuals with antisocial behaviour show deficits in recognition of each of the six basic expressions, whether the impairment is greatest for fear, and whether deficits in fear are attributable to task difficulty. The authors carried out a comprehensive search to identify relevant studies (n = 20). Methods included a search of PsycINFO and PubMed, and a search of reference lists, citation reports, and unpublished manuscripts. The authors concluded that antisocial populations exhibited significant deficits in recognising fearful, sad, and surprised expressions, and that deficits in recognising fear were significantly greater than other impairments. Moreover, they found that this impairment was not attributable to task difficulty. It remains to be investigated to what extent their conclusions generalise to populations of violent prisoners specifically, who arguably display more severe aggression and exhibit greater antisocial pathology than those continuing to reside in the community (Pascual-Leone et al., 2011). Furthermore, Marsh and Blair (2008) analysed samples of children and adults together. However, recent research suggests that the facial emotion recognition abilities of children differ to those of adults (Leime, Rique Neto, Alves & Torro-Alves, 2013), weakening the validity of the conclusions drawn when applying them to adults per se. Additionally, Marsh and Blair's meta-analysis, published in 2008, only included studies up to 2005, and many studies have been carried out in the field since then.

Mellentin et al. (2015) reviewed 15 studies to explore whether anger-prone and aggressive individuals show an anger bias when perceiving facial expressions in

neuropsychological paradigms. Search strategy included the use of EMBASE, PubMed, PsycINFO, and Web of Science, as well as a search of references. The review included community, forensic and clinical samples of children and adults, and the authors found that anger-prone and aggressive individuals showed a bias towards perceiving anger and hostility in facial expressions.

Reviews exploring facial affect processing in psychopathic populations

The meta-analysis carried out by Dawel et al. (2012) reviewed 26 studies evaluating emotion recognition across visual and auditory modalities (vocal, facial and postural) in forensic, clinical and community samples of psychopathic individuals. Search strategies included the use of PsycINFO, PubMed and Web of Science, and a hand search of reference lists. The authors found that psychopathy was associated with deficits for positive as well as negative emotions across modalities. Specifically, of the six emotional categories explored, deficits were found for fear, happiness and surprise for facial and vocal expressions, and sadness for facial expressions. Moreover, the authors found that, for children, the deficit for fear was greater than the deficit for other emotions. Although this meta-analysis included participants from forensic settings, results were not analysed as a function of offending status and therefore it does not aid understanding of emotion recognition deficits among violent offenders, and whether or how patterns of impairment differ from other types of offender.

Finally, Brook et al. (2013) reviewed research on emotion processing to explore whether psychopathy is associated with generalised emotion recognition deficits or deficits in the recognition of particular emotions. The authors searched PsycINFO and PubMed databases and included 58 studies in the review. Of these, eleven studies examining emotion recognition in psychopathic offenders were reviewed separately. They did not find conclusive

evidence for either perspective regarding emotion recognition deficits in offenders with psychopathic features. Nonetheless, given that the prevalence of psychopathy in prisoners across England and Wales has been found to be approximately 7% to 8% (Coid et al., 2009), findings from samples of psychopathic offenders cannot be reliably generalised to the vast majority of the prison population, and are therefore of limited utility in effectively informing forensic practice.

Aims and objectives of the current review

This review aimed to systematically explore research that has examined facial affect processing in violent offenders. Several questions were investigated in relation to this aim:

1. Is there a consistent pattern of facial affect processing seen in violent offenders relative to non-offending control participants?
2. How do the facial affect processing abilities of violent offenders compare to non-violent offenders?
3. Do patterns observed differ depending on the inclusion or exclusion of sexual offenders?

Method

Sampling and search procedure

A scoping search was conducted in order to establish the potential volume of publications relating to this topic. A thorough and systematic search was then carried out in order to identify relevant studies. The following search methods were employed:

1.   Search of electronic databases

A comprehensive search of electronic databases was undertaken in order to identify relevant publications. Four bibliographic databases were used:

- Ovid: PsycINFO (1967 to May Week 1 2016)

- Ovid: EMBASE (1974 to May 6th 2016)

- Ovid: MEDLINE (1946 to April Week 4 2016)

- ISI Web of Science (all years to May Week 1 2016)

The Cochrane Library and Google Scholar (all years on 8th May 2016) were also searched in order to identify existing reviews in the area.

A standardised search strategy was applied to search the databases, although modifications had to be made to meet the specific requirements of each database, which therefore introduces some variation. The search was restricted to English language publications. Book chapters, dissertations, editorials, and comment papers were excluded from the review. Grey literature was not included to ensure that only peer reviewed articles were analysed.

Search terms:

(fac* perception OR fac* expressions OR facial affect recognition OR facial affect decoding OR emotion recognition OR emotion categorisation OR emotion processing OR facial affect processing OR emotional displays OR social cognition OR affective processing)

AND

(violen* OR domestic violence OR intimate partner violence OR violent crime OR perpetrators OR criminals OR prisoner OR offender OR incarcerated)

Keywords and exploded search terms were used in order to increase the likelihood of identifying all of the relevant papers (see Appendix I).

2. Reference lists of reviews related to emotion in offenders.

3. Reference lists of papers meeting inclusion criteria and their citation reports.

4. Hand-searching journals. Key journals were identified from the electronic database searches and searched for relevant articles. These included:

Journal of Psychiatric Research, International Journal of Law and Psychiatry, Journal of Aggressive Behaviour, European Archives of Psychiatry and Clinical Neuroscience, Emotion.

Study selection

Titles and abstracts of the identified papers were scanned in order to eliminate obviously irrelevant studies. Following removal of duplicates, the remaining studies were

made subject to the inclusion/exclusion criteria detailed below (Table 1). These criteria were

informed by the initial scoping exercise.

Table 1. Inclusion/exclusion criteria

	Inclusion	**Exclusion**
Population	Incarcerated violent offenders. Index offence or historical offence. Including intimate partner violence (IPV) and sexual violence. Adult males (aged 18 and over).	Clinical samples of violent offenders (i.e., psychiatric patients). Juvenile/adolescent offenders (under 18 years). Samples of 'antisocial offenders' whereby offence not specified or analysis as a function of nature of offending not carried out. Community samples self-reporting violence/ non-convicted individuals. Females.
Intervention	Facial affect processing task using static displays of any combination of the six basic emotions. Pure emotion or morphed developed using validated and normed stimuli.	Other measures of emotional processing not including facial affect (e.g., Stroop tasks). Non-static displays. Studies including context (e.g., story) or affective stimuli other than face (e.g., body posture).
Comparator	Non-violent adult male offenders and/or samples of IPV offenders and/or samples of sexual offenders, and/or non-offending controls.	Studies that do not distinguish between violent and non-violent offenders.
Outcome	Accuracy of facial expression categorisation or sensitivity to discriminating/perceiving emotional expression. Response bias to ambiguous or neutral expressions. Measured via forced-choice or free-response format.	Studies that ask participants to infer anything other than emotion from facial affect slides (e.g., thoughts).
Study type	Quasi-experimental	Other

The primary criterion for inclusion in the review was that the study investigated facial processing (recognition accuracy, sensitivity or response/attribution bias) in violent offenders. To ensure that participants' violence sufficiently deviated from behaviour deemed as normal or acceptable, samples of incarcerated offenders were chosen as the population. The violent offence could be current or historical. Comparators could include a separate sample of sexual or IPV offenders (when they were not included in the "violent" group), non-violent offenders (such as theft, substance misuse, fraud), or non-offending controls. Given evidence that difficulties in recognising others' facial expressions of emotion are found in neuropsychiatric conditions such as schizophrenia (e.g., Trémeau, 2006) and anxiety disorder (e.g., Demenescu et al., 2010; Easter et al., 2005), among others, studies were excluded if they specifically examined clinical populations, in order to reduce the chance of spurious relationships. Only studies analysing male samples were included due to evidence of sex differences in facial affect recognition abilities (Robinson et al., 2012). Furthermore, as research has reported differences in emotion recognition abilities between child, adult, and elderly samples (Leime et al., 2013; Sullivan, Ruffman & Hutton, 2007), only adult (18+) populations were studied in order to ensure maturation of socio-cognitive development.

Only studies examining one or more of the six basic emotions of anger, disgust, fear, happiness, sadness, and surprise were considered for review. These emotions were selected for consistency with previous reviews and due to evidence of their being universally recognised (e.g., Ekman & Friesen, 1971; Elfenbein & Ambady, 2002). This meant that it was not considered necessary to limit investigations to those carried out in Western society. Studies had to include a facial affect categorisation task to be included in the review. The

stimuli had to be developed from appropriately normed or validated images so as to provide an objective criterion for judgement. As the review was focused solely on the investigation of facial expression of emotion, studies that presented affective stimuli in addition to facial displays (such as postural or vocal information) were excluded due to their providing accompanying emotional information. Similarly, studies utilising contextual information such as stories or stimulated scenarios were excluded. Only static facial stimuli were reviewed (including morphed facial stimuli to allow for a measure of emotion recognition sensitivity and/or attribution bias).

Finally, only articles from peer-reviewed journals were included to ensure a minimum threshold for quality, and non-English studies were excluded due to an inability to interpret data.

Data Extraction

Information was extracted from the studies that satisfied the inclusion criteria using a pro forma (see Appendix II) to ensure systematic recording and reporting of information. Specifically, information relating to population characteristics, methodology, outcome measures and analyses was extracted and provided sufficient information to inform the quality assessment process. Table 2. highlights key information from each study reviewed.

Quality assessment

The following steps were taken in order to assess the quality of the studies meeting the inclusion criteria:

1.   Threshold criteria

- Clear description of measures of predictor variables

- Clear description of outcome measures

Studies that did not meet these two criteria would not have been subsequently subjected to the quality assessment form.

2. Quality assessment forms

A quality assessment form comprising 20 questions relating to methodological quality was used (Appendix III). The form allowed study biases relating to selection/sampling, performance, measurement and analysis to be identified and assessed in a structured way. Each item pertaining to these factors was scored on a three-point Likert-scale. This allowed for an overall quality score to be calculated. When the item was not applicable it was omitted. Likewise, when there was unclear or insufficient information that could not be clarified by authors, the item was omitted.

The scoring system was as follows:

Condition not met (N) = 0

Partially met (P) = 1

Condition fully met (Y) = 2

The overall quality score was calculated by adding all the scores together; yielding a maximum quality score of 40 if no items were omitted. Scores were converted into a percentage to enable clear comparison of quality between the studies. A minimum threshold of 60% quality was set for the study to be included in the review. This was regarded as a reasonable threshold to ensure that only good quality studies were reviewed, whilst ensuring that a sufficient number of studies were reviewed. An independent rater assessed 50% of the

studies in order to ensure that assessment scores were reliable. No difference greater than two points was obtained and, in each case, did not affect whether the study met the threshold for inclusion.

Of the eight studies that met the inclusion criteria, seven were assessed as being of high enough quality to include in the review. One study (Hudson et al., 1993) obtained a quality score of 57% and thus was excluded from the review. The quality of the remaining studies reviewed ranged from 65- 78%. Studies obtaining a score of > 70% were considered to be the methodologically stronger studies in analyses. Figure 1 depicts the process of the study selection and highlights the number of studies retained and excluded at each stage of the process. Papers retrieved in full that did not meet the inclusion criteria are listed in Appendix IV.

Total hits from electronic databases
$n = 430$

PsycInfo = 272
EMBASE = 84
MEDLINE = 64
Web of Science = 10

Duplicates excluded $n = 63$

Excluded following search of abstracts $n = 345$

Could not obtain $n = 1$

Papers retrieved for detailed assessment $n = 21$

Studies identified from reference lists $n = 1$

Excluded $n = 14$

No non-sexual violent group $n = 4$

Additional contextual information $n = 3$

No measure of facial affect processing $n = 2$

Insufficient detail pertaining to offending status $n = 2$

No control group $n = 1$

Psychiatric population $n = 1$

Non-English paper $n = 1$

Studies meeting inclusion criteria $n = 8$

Excluded on the basis of quality assessment $n = 1$

Studies included in review $n = 7$

Figure 1. Process of study selection

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Table 2. Characteristics of reviewed studies

Study and Quality Score	Participants	Aim(s)	Task Variables and Recognition Parameter(s) Studied	Results
Gillespie, Rotshtein, Satherley, Beech & Mitchell (2015) 65%	Sexual offenders ($n = 13$) and violent non-sex offenders ($n = 16$) recruited from a Therapeutic Community in England UK. Males aged 24-58 years old (mean age of sex offender sample = 50.5, mean age of violent offenders = 37.8). Male non-offending community	To examine emotion recognition accuracy for the six basic emotions among sexual and violent offenders compared with	*Stimuli*: taken from the NimStim Face Stimulus Set (Tottenham et al., 2009). *Gender of models*: five male and five female *Emotions studied*: happy, sad, angry, fear, surprise, disgust, neutral *Intensity of expression*: low intensity (10% expressive,	*Method of analysis* Sensitivity was calculated as the discriminability index (i.e., the difference between the hit rate and false alarm rate). Response bias was calculated as the criterion (with lower values indicating a more liberal response style). Responses were analysed using a mixed-model ANOVA. Significant interactions were

controls (*n* = 19). Aged 26-67 years old (mean age = 48.2). Matched on: gender	healthy controls. To examine the effect of intensity of expression and sex of model on recognition	90% neutral), moderate intensity (55% expressive), and high intensity (90% expressive). *Number of slides*: 180 trials depicting a different stimulus varying in model (10), expression (6) and intensity (3). *Presentation delivery*: randomised *Response format*: face remained on screen until participant chose from seven	broken down with further ANOVAs. *Sensitivity* Non-offenders showed greater sensitivity to fearful expressions compared to sexual (*p* = .007) and violent (*p* = .015) offenders. Non-offenders also showed greater sensitivity to disgust expressions compared to sexual offenders (*p* = .009). The effect of group was non-significant for angry, happy, sad, and surprised expressions (all *p* > .20). There was a significant interaction of group and expression for female faces at

| | | | | options (six emotions plus neutral) which emotion was depicted. *Recognition parameters assessed:* sensitivity and response bias | a high intensity (p = .031). In particular, sexual offenders showed reduced sensitivity to female angry expressions compared to non-offenders (p = .014) and violent offenders (p = .021). Non-offenders were more sensitive to female expressions of disgust compared with sexual offenders (p = .005), and were more sensitive to female expressions of fear compared to both sexual (p = .029) and violent (p = .014) offenders. *Response bias* For moderate intensity male faces, violent offenders showed a more |

				conservative response style for labelling faces as disgust or fear relative to angry, happy or sad (all $p < .01$). For high intensity male faces, violent offenders showed a more conservative response style for fear relative to all other emotions ($p < .01$), together with a lower criterion for labelling faces as sad compared to disgust and surprise ($p < .05$).
Hoaken, Allaby & Earle (2007) 70%	20 incarcerated violent* offenders (mean age 34.7) 20 incarcerated non-violent offenders (mean age 32.9) from a	To investigate whether the relationship between	*Stimuli*: taken from Ekman's faces of emotional affect (Ekman & Friesen, 1976). *Gender:* not specified	*Method of analysis* For accuracy, a one-way ANOVA was computed on the number of incorrect responses across all trials. For response

medium security institution in Canada.	executive cognitive functioning and aggression may	*Emotion:* happiness, surprise, sadness, fear, anger, disgust, and neutral	bias, a count of the emotions each participant attributed to the neutral face
20 university undergraduates and community controls (mean age 25.2).	be due to impairments in the encoding	*Intensity*: 100% *Number of slides*: 102 *Presentation*	was entered into mixed-model ANOVA to assess for group differences. ANOVAs used for all post-hoc
Matched on: gender	and interpretation	*delivery/response format:* Randomised. Face presented	analyses. *Accuracy*
*Definition of violent offender based on Harris, Rice and Cormier's (2002) definition, i.e., any individual who was incarcerated for "any criminal charge for a violent offence	levels of social information processing.	for 2000 ms, after which participants had to rate which emotion was depicted from six options (neutral was not an option). *Recognition parameters*	The violent group made a greater number of errors than the non-violent or non-offending groups (*p* <.001), who did not differ from each other. However, an analysis of errors as a function of emotion was not conducted. *Response bias*

			assessed: accuracy and response bias	The groups differed in how frequently they labelled the face as sadness (p <.05) and disgust (p <.05). Violent offenders were less likely to interpret a neutral face as "sadness" than were non-offending controls (p <.05) and were more likely to interpret it as "disgust" than were non-violent offenders (p <.05).
against persons- e.g., assault, assault causing bodily harm, wounding, attempted homicide, homicide, kidnapping, forcible confinement, armed robbery and all 'hands-on' sexual offences" (p. 383). Non-violent offenders were those without a history of the above (thus including non-contact sexual offenders)				
Robinson et al. (2012) 70%	Convicted prisoners in Scotland, recruited as part of an investigation which examined a screening tool for autistic	To explore whether prisoners show an 'antisocial'	Stimuli: taken from the Ekman and Friesen stimulus set (1976). Gender: not specified but 10	Method of analysis Mean differences between offender and non-offender groups analysed using t-tests. Repeated measures ANOVAs

characteristics. 116 prisoners (mean age = 35.6) who either were most likely to have high levels of autistic traits or who evidently did not have high levels, were examined in greater detail. Participants' were categorised taking into consideration previous convictions. Two groups: those who had ever committed violent offences (including sexual offences) and non-violent offences.	pattern of deficits in decoding emotional expressions relative to controls. To examine whether social cognition is related to markers of antisociality	models *Emotions:* happy, sad, anger, fear, surprise and disgust. *Intensity*: 100% *Number of slides*: 60 (one expression per emotion for each model). *Presentation delivery:* randomised. Stimuli shown for five seconds. *Response format:* the names of the six emotions were shown on the screen and participants asked to select	were used to examine recognition accuracy between groups, with the effect of group explored further using one-way ANOVAs. *Accuracy* There was no significant difference in emotion recognition between or within offenders with a violent conviction and offenders without (*p*-value not reported). Prisoners with a sexual index offence were better at recognising sadness (*p* = .046) and worse at recognising surprise (*p* = .006) in comparison to other

	One participant had dissociative symptoms and one had features suggestive of an organic brain syndrome. A community control group (n = 130, mean age = 37.2). Groups matched for age, sex and IQ.	and offence history.	which best described the expression just shown. *Recognition parameter assessed:* accuracy	prisoners (both violent and non-violent). *Comparison with non-offending controls* Prisoners were significantly less accurate in recognising sadness, anger, fear (all $p < .001$) and disgust ($p < .05$) in comparison to controls. N.B. Effects held when levels of autistic traits controlled for.
Schönenberg, Christian, Gauber, Mayer, Hautzinger	44 antisocial violent offenders (mean age = 35.32) recruited from a German correctional facility. Excluded offenders charged with intimate partner	To examine facial recognition impairment in antisocial	*Stimuli:* digitised colour photographs chosen from the Radboud Faces Database (Langner et al., 2010) based on accuracy of expression.	*Method of analysis* Correct responses at time of button press analysed using repeated-measures ANCOVA, with age as covariate. Effect of group followed up using t-tests.

and Jusyte (2014) 75%	violence, sexual assault and drug-related crime (reason not provided). None had a history of schizophrenia or mental retardation. 43 community controls (mean age = 29.34). Matched for education and gender.	violent offenders with psychopathic personality traits by assessing perceptual sensitivity to emotional expressions.	*Gender:* three male models *Emotion:* angry, happy, fearful, sad, surprised, disgusted as well as neutral *Preparation of stimuli:* each emotional expression depicted by every model was morphed with a neutral expression in increments of 2%. This produced 51 intensity levels ranging from 0% (neutral) to 100% (full emotion). *Number of slides:* 72 *Delivery:* sequence displayed	*Accuracy* There was a significant main effect of emotion only ($p < .001$), with both groups making more errors for fearful, disgusted and surprised expressions. *Sensitivity* Violent offenders exhibited significantly impaired recognition of fearful ($p < .01$) and surprised ($p = .01$) expressions relative to non-offending controls, i.e., they required greater emotional intensity to correctly detect the emotional expressions.

			consecutively	
			Response: participants had to press a button as soon as they were able to identify the emerging expression. The stimulus was then removed and participant had to indicate the emotion that they saw in a multiple choice manner. *Recognition parameters assessed:* accuracy and sensitivity	
Schönenberg & Jusyte	55 antisocial violent incarcerated offenders, recruited from a	To explore a hostile response	*Stimuli:* selected from the Radboud Faces Database	*Method of analysis* For response bias, a series of 5

(2014). 75%	German correctional facility (mean age = 33.35). Exclusion criteria were drug-related crime, IPV or sexual assault. All offenders fulfilled the criteria for Antisocial Personality Disorder (ASPD). Four were also diagnosed with major depression and with dysthymia. None had a history of schizophrenia, BPD, or mental retardation. 55 healthy controls (mean age = 30.38) recruited from local vocational schools. Matched for	bias by assessing response styles to ambiguous facial cues in antisocial violent offenders compared to matched controls.	(Langner et al., 2010). *Gender:* three male models *Emotion:* angry, happy, fearful *Preparation of stimuli*: faces were morphed with each other to create three continuous dimensions (happy-fearful, happy-angry and fearful-angry). Each dimension had five distinct intensity levels containing different amounts of each blended emotion (intensity rations: 90:10, 70:30, 50:50, 30:70, and	(intensity) x 2 (group) x 3 (dimension) repeated measures ANOVAs were conducted. Significant effects on group were followed up with *t*-tests. Independent *t*-tests were computed for intensity ratings for the three dimensions at 50:50 ratio (i.e., most ambiguous expression). *Response bias* A significant effect of intensity emerged for the happy-fearful dimension ($p <$ .001), but neither group nor the intensity x group interaction reached significance.

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education status and age. Control participants did not have a history of psychiatric morbidity.		10:90). *Number of slides:* 45 *Presentation delivery*: images were repeated four times. Pseudo- randomised across emotions and intensity levels. Presented for 500ms. *Response format:* forced-choice. Open-ended time frame. Participants then rated the intensity level of the emotion identified on a scale ranging from 0 (not at all present) to	For the angry-fearful dimension, violent offenders made significantly more 'angry' responses under conditions of maximal ambiguity (50:50) than did non-offenders ($p < .01$) For the angry- happy dimension, violent offenders responded with 'angry' under conditions of maximal and high ambiguity (50:50 and 30% angry: 70% happy) than did non-offenders ($p < .05$). *Perceived intensity ratings* Violent offenders rated the perceived intensity of anger in ambiguous angry-

			10 (full blown emotion). *Recognition parameters assessed:* response bias	happy and angry-fearful faces significantly higher than non-offenders ($p <. 05$ and $p < .01$, respectively). No significant group difference was found for the happy-fearful dimension ($p > .1$).
Schönenberg, Louis, Mayer & Justye (2013) 78%	32 prisoners convicted for 'repeated' grievous bodily harm. All met criteria for ASPD. Did not include individuals charged with IPV, sexual offences, or drug-related offences. Exclusion criteria included offenders with BPD or schizophrenia. 32 controls without a history of	To examine identification of threat-related facial expressions in violent offenders with ASPD.	*Stimuli:* digitised colour photographs chosen from the Karolinska Directed Emotional Faces database (Lundqvist, Flykt & Ohman, 1998). *Gender:* two male models. *Emotions:* angry, happy, fearful, neutral	*Method of analysis* Intensity of correct detection of emotional expressions at time of button press analysed using a repeated measures ANOVA followed by separately computed *t*-tests to explore significant effects involving group. *Sensitivity* Violent offenders required significantly

offending or psychopathology. Matched on age and education.		*Preparation of stimuli:* morphing procedure used to produce stimuli increasing in intensity by increments of 2%. This produced 51 intensity levels ranging from 0% (neutral) to 100% (full emotion). *Number of slides*: Maximum of 2130 (30 sequences of two models depicting three emotions at 51 intensity levels plus five repeated morphs). *Presentation/response format:*	higher intensity levels to detect angry expressions than did controls ($p = .014$, $n^2 = .10$). There was a trend toward violent offenders requiring higher emotional intensities for identifying fear expressions, although this did not reach statistical significance ($p = .068$). Groups did not differ in their sensitivity to happy expressions ($p = .150$). *Accuracy* Groups did not differ in their recognition accuracy of angry, happy and fearful expressions ($p = .415$).

			each image presented for 500 ms, beginning with 0% and progressing successively in increments of 2% to 100%. Participants pressed button as soon as they were able to identify the emerging emotion. Sequence then terminated and participant required to indicate which emotion they detected (response options provided not specified). *Recognition parameter*	

			assessed: sensitivity and accuracy	
Seidel, Pfabigan, Keckeis, Wucherer, Jahn, Lamm & Derntl (2013) 75%	30 incarcerated violent offenders (mean age 35.6) and 30 non-offenders (mean age 34.8) matched for age, sex (males), education and intelligence. Most offenders ($n = 22$) had cluster B personality disorders. Some had a history of alcohol ($n = 10$) or drug ($n = 3$) dependence. Their mean PCL-R score was 21.5 (medium to high scorers).	To test the three stage model of empathy in violent offenders compared to matched controls (i.e., emotion recognition, perspective taking and	*Stimuli:* colour photographs of Caucasian faces were taken from a standardised stimulus set (Gur et al., 2002). *Gender:* gender-balanced but unknown number of models *Emotions:* happiness, sadness, anger, fear, disgust and neutral. *Intensity:* 100% *Number of slides*: 36 *Presentation/response format:*	*Method of analysis* Accuracy data were analysed using repeated-measures ANOVAs. Significant effects on group were explored using a series of *t*-tests. *Accuracy* There were no significant differences for accuracy when the violent group was divided up into sexually violent offenders and non-sexually violent offenders ($p > .177$). A significant effect of group was found

| | | affective responsiveness). | stimuli were presented for five seconds and remained on screen with six response categories (happiness, sadness, anger, fear, disgust and neutral) until a response was given. *Recognition parameter assessed:* accuracy | (p = .026) with offenders impaired relative to non-offending controls. A significant emotion by group interaction was found (p = .049). Post-hoc tests revealed that controls outperformed offenders for disgust only (p = .001). There were no significant differences between groups for all other emotions (p > .164). |
| | The non-offending control group were recruited by advertisements. They had no history of psychiatric illness, neurological illness, or substance abuse in themselves and their first degree relatives. | | | |

Results

Descriptive overview

Characterisation of the samples

Violent offenders were operationalised and compared in the following ways across the seven studies reviewed:

1. Violent offenders (including sex offenders) compared to non-violent offenders and non-offenders (Hoaken et al., 2007; Robinson et al., 2012)

2. Violent offenders (including sex offenders) compared to non-offenders (Seidel et al., 2013)

3. Violent offenders (excluding sex offenders) compared to non-offenders (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014).

4. Violent offenders compared to sexually-violent offenders and non-offenders (Gillespie, Rotshtein, Satherley et al., 2015).

Defining violent offender

In the majority of studies, offenders were classified into relevant participant groups (i.e., violent or non-violent) on the basis of the nature of their index offence. However, two studies looked at previous convictions in assigning participants to offender groups (Hoaken et al., 2007; Robinson et al., 2012).

Hoaken et al. (2007) categorised participants into groups based on Harris et al.'s (2002) definition of a violent offence (see Table 2). Other studies did not specify how

violence was defined, although Gillespie, Rotshtein, Satherley et al. (2015) provided examples of some violent offences included (murder and wounding with intent to do grievous bodily harm) and Schönenberg, Christian et al. (2014) and Schönenberg and Justye (2014) specified offences that were excluded (reported below). Finally, Schönenberg et al. (2013) specifically sampled violent offenders who had committed 'repeated' grievous bodily harm.

Controls and sample characteristics

All seven studies compared violent offenders to a non-offending control group. These were recruited from the community, including undergraduate students (Hoaken et al., 2007). Three studies matched experimental and control groups for age and education level (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014), one study matched groups on age and intelligence (Robinson et al., 2012), and another also matched on education (Seidel et al., 2013). Two studies did not match groups on these variables (Gillespie, Rotshtein, Satherley et al., 2015; Hoaken et al., 2007). All studies compared male samples in analyses. Sample sizes of violent offenders ranged from 16 (Gillespie, Rotshtein, Satherley et al., 2015) to 87 (Robinson et al., 2012), with ages of offenders ranging from 18 to 62.

Studies varied in the sampling of psychiatric diagnoses. Schönenberg, Christian et al. (2014) only sampled offenders with 'psychopathic tendencies'. In the violent sample of Schönenberg et al. (2013) and Schönenberg and Jusyte (2014), all participants filled criteria for Antisocial Personality Disorder (ASPD). In the former sample, two men also met the criteria for historical major depressive disorder, while in the latter sample, four men were diagnosed with major depression and two met criteria for dysthymia. None had a history of schizophrenia (Schönenberg et al., 2013; Schönenberg, Christian et al. 2014; Schönenberg &

Jusyte, 2014), mental retardation (Schönenberg, Christian et al. 2014; Schönenberg & Jusyte, 2014) or BPD (Schönenberg et al. 2013; Schönenberg & Jusyte, 2014). In Seidel et al.'s (2013) sample of offenders, 13 participants had a history of alcohol/drug dependence and 22 were diagnosed with Cluster B personality disorders. In addition, the sample scored medium-high on the PCL-R (mean = 21.5). In Robinson et al.'s (2012) sample of offenders, one participant had dissociative symptoms and one had features suggestive of an organic brain syndrome.

In terms of control groups, the sample of Schönenberg et al. (2013) and Schönenberg and Jusyte (2014) had no current or historical psychiatric morbidity, and the sample of Seidel et al. (2013) did not have a history of psychiatric/neurological illness or substance abuse. Neither Gillespie, Rotshtein, Satherley et al.'s (2015) nor Hoaken et al.'s (2007) studies contained information pertaining to psychological disorders in either experimental or control samples.

Exclusion criteria

Three studies excluded from their group of violent offenders individuals charged with domestic violence, sexual assault or drug-related crime (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014), as well as individuals with inadequate knowledge of the German language (Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014). Another study excluded prisoners with an IQ less than 70 and/or those scoring above the diagnostic cut off for Autistic Spectrum Disorders (Robinson et al., 2012). Finally, one study excluded those who were denying their offence or appealing their conviction (Hoaken et al., 2007).

Task characterisation

Two studies (Hoaken et al., 2007; Robinson et al., 2012) used the Pictures of Facial Affect stimulus set (Ekman & Friesen, 1976), two studies (Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014) used stimuli from the Radboud Faces Database (Langner et al., 2010), one study (Schönenberg et al., 2013) selected stimuli from the Karolinska Directed Emotional Faces database (Lundqvist, Flykt & Ohman, 1998), one study (Gillespie, Rotshtein, Satherley et al., 2015) used stimuli from NimStim Face Stimulus Set (Tottenham et al., 2009), and one study (Seidel et al., 2013) used a stimulus set developed and validated by Gur et al. (2002). Three of these studies used male models only (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014) and two did not specify the gender of the models (Hoaken et al., 2007; Robinson et al., 2012).

Two studies investigated the six basic emotions plus a neutral expression (Hoaken et al., 2007; Schönenberg, Christian et al., 2014), two studies investigated the six basic emotions (Gillespie, Rotshtein, Satherley et al., 2015; Robinson et al., 2012), one study investigated five emotions (excluding surprise) plus a neutral expression (Seidel et al., 2013), and two studies investigated anger, happiness and fear (Schönenberg et al., 2013; Schönenberg & Jusyte, 2014).

All stimuli were presented supraliminary. Three studies displayed the stimulus for a limited duration (Hoaken et al., 2007; Robinson et al., 2012; Schönenberg et al., 2013; Schönenberg & Jusyte, 2014). For the remaining studies, the stimulus remained on screen until the participant was either ready to make (Schönenberg, Christian et al., 2014) or made a response (Gillespie, Rotshtein, Satherley et al., 2015; Seidel et al., 2013). Six studies used a

forced-choice response format with an open-ended time frame. The response format of Schönenberg et al. (2013) is not clear.

Outcomes measured

Facial affect processing was measured using three parameters:

1. *Accuracy* - measured by the number of correct responses ("hits") to emotional expressions (assessed by Hoaken et al., 2007; Robinson et al., 2012; Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Seidel et al., 2013).

2. *Sensitivity* to emotional expression - including both perceptual sensitivity (assessed by using morphing techniques to create emotional expressions of various intensities; Schönenberg et al., 2013; Schönenberg, Christian et al., 2014) and discriminability sensitivity (assessed by Gillespie, Rotshtein, Satherley et al., 2015 as the difference between hit rate and false alarm for a given expression).

3. *Response bias* - measured by responses made to ambiguous expressions (created using morphing techniques, Schönenberg & Jusyte, 2014) or when forced to attribute emotion to a neutral expression (Hoaken et al., 2007). Response bias was also measured using a measure of criterion to assess the extent to which a conservative or liberal response style was adopted when labelling emotional faces (Gillespie, Rotshtein, Satherley et al., 2015).

Study outcomes

The results of the reviewed studies were analysed with a goal of identifying whether there is a consistent pattern of facial affect processing associated with violent offending, and

whether the recognition patterns of violent offenders differ to that of non-violent offenders. The results are reported as a function of recognition parameter in answering the review questions.

Do violent offenders exhibit impairments in facial affect processing relative to non-offending controls?

Accuracy

Seidel et al. (2013) found that violent offenders showed deficits in the recognition of disgust expressions only. However, it is noted that this study did not examine recognition for surprise expressions. Robinson et al. (2012) found that violent offenders were significantly less accurate in recognising sadness, anger, fear and disgust in comparison to non-offenders, and Hoaken et al. (2007) found that, overall, violent offenders made significantly more errors than did the non-offenders. However, an analysis of between group differences across the six emotions was not conducted. The only studies examining accuracy which excluded sexual offenders did not find significant differences between the violent group and non-offending group (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014).

Sensitivity

Gillespie, Rotshtein, Satherley et al. (2015) found that violent offenders were significantly less sensitive to discriminating fearful expressions compared to non-offenders. Moreover, the violent offenders were significantly less sensitive to female fearful expressions at high intensities compared to non-offenders. Finally, in addition to the aforementioned deficits, Gillespie, Rotshtein, Satherley et al. (2015) found that sexually-violent offenders

showed significantly reduced sensitivity to disgust expressions and to female angry and disgust expressions at high intensities relative to non-offenders.

Using male models only, Schönenberg et al. (2013) found that a sample of non-sexually violent offenders required significantly higher levels of intensity to detect anger in comparison to non-offenders, and there was a trend toward the same for the identification of fear expressions. Using a similar sample and procedure but examining sensitivity to six emotional categories, Schönenberg, Christian et al. (2014) found that violent offenders showed significantly impaired sensitivity to fearful and surprised expressions compared to non-offenders.

Response bias

Hoaken et al. (2007) found that violent offenders (including sexual offenders) were significantly less likely to interpret a neutral face as sadness compared to non-offenders. Schönenberg and Jusyte (2014) found that violent offenders made significantly more 'angry' responses to ambiguous displays containing anger in comparison to controls. Specifically, violent offenders were more likely to interpret anger under conditions of maximal ambiguity (50:50) for an angry-fearful dimension and under all conditions of ambiguity for an angry-happy dimension (50:50 and 30:70). Furthermore, the violent offenders rated the perceived intensity of anger in these two dimensions significantly greater than did non-offending controls. No significant difference was found between groups for a happy-fearful dimension.

In looking at response style to the six emotional expressions, Gillespie, Rotshtein, Satherley et al. (2015) found that, for moderate intensity male faces, violent offenders showed a more conservative response style for labelling faces as disgust or fear relative to

angry, happy or sad. For high intensity male faces, violent offenders showed a higher criterion for labelling fear relative to all other emotions, but were more liberal when labelling faces as sad compared with disgust and surprise. The same interaction between emotion, sex and intensity of expression was not observed for either non-offenders or sex offenders.

How do violent offenders' facial affect processing abilities differ to those of non-violent offenders'?

Accuracy

Hoaken et al. (2007) found that, overall, violent offenders (which included sexual offenders) made significantly more errors than did non-violent offenders but an analysis to determine the nature of these errors was not conducted. In contrast, using a repeated-measures ANOVA, Robinson et al. (2012), did not find a significant difference in emotion recognition accuracy between offenders with a violent conviction (including sexual) and those without.

Sensitivity

None of the studies reviewed compared violent offenders to non-violent offender on measures of sensitivity.

Response bias

The only study to look at response bias among samples of violent and non-violent offenders found that violent offenders (including sexual offenders) were more likely to interpret a neutral face as disgust relative to non-violent offenders (Hoaken et al., 2007).

Does the inclusion of sex offenders in violent samples affect the deficits that are observed?

Studies that included sex offenders in their sample of violent offenders

One study found that the violent/sexually-violent group was less accurate at recognising disgust compared to non-offenders (Seidel et al., 2013) whilst another also found deficits in sadness, anger and fear in violent/sexually-violent offenders compared to non-offenders (Robinson et al., 2012). Robinson et al. (2012) did not find any differences between the mixed violent offender group and the non-violent offenders. However, a third study found that, overall, the violent/sexually-violent group made a greater number of errors than both a non-violent and a non-offending group, but did not analyse results by emotional category (Hoaken et al., 2007). Furthermore, Hoaken et al. (2007) found that the violent/sexually-violent offenders were more likely to interpret a neutral face as 'disgust' relative to non-violent offenders, and were less likely to interpret a neutral face as 'sadness' relative to non-offenders. It is noted that, in this latter study, an individual who had committed a non-contact sexual offence was analysed as a non-violent offender. Thus, the non-violent sample also included sex offenders.

Studies that excluded sex offenders from their sample of violent offenders

Three studies excluded sex offenders from their sample of violent offenders (as well as excluding IPV offenders and offenders with a history of drug-related crime) and compared this to a sample to non-offenders (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Schönenberg & Jusyte, 2014). While Schönenberg et al. (2013) and Schönenberg, Christian et al. (2014) did not find deficits in the recognition accuracy of violent offenders

relative to non-offenders, they did find that the violent offenders were less sensitive to recognising angry (Schönenberg et al., 2013) and fearful and surprised expressions (Schönenberg, Christian et al. 2014), as measured by their requiring greater emotional intensity to correctly detect the expression. The third study found that the violent offenders made significantly more 'angry' responses to 50:50 angry-fearful faces than did non-offenders. Likewise, the offenders made more angry responses to 30% angry: 70% happy and 50: 50 than did non-offenders (Schönenberg & Jusyte, 2014). As none of these studies compared violent offenders to a sample of non-violent offenders, it is not clear to what extent the findings are attributable to antisocial pathology as opposed to violent behaviour more specifically.

Overall, both types of sampling method revealed different patterns of facial affect processing in the violent sample relative to non-offending controls. The absence of studies comparing non-sexually violent offenders to non-violent offenders means that it is not possible to review whether differences in sampling method affected whether deficits were observed relative to non-violent offenders. Although tentative, there is some indication that recognition inaccuracies were more reliably observed in the violent/sexual-violent sample. Similarly, there is some indication that deficits in the processing of disgust expressions are only found when the violent sample includes sex offenders.

Studies that analysed sex offenders separately

Two studies compared sex offenders to non-sexual violent offenders. Gillespie, Rotshtein, Satherley et al. (2015) compared sex offenders to violent offenders and non-offenders. They found that both groups of offenders were less sensitive to recognising fear compared to non-offenders, and that sex offenders were less sensitive to recognising disgust

compared to non-offenders. Gillespie, Rotshtein, Satherley et al. (2015) also found that emotion processing abilities may be dependent on the sex and the intensity of the emotional expression. Specifically, sex offenders and violent offenders were less sensitive to female fearful expressions at high intensities compared to non-offenders. Sex offenders were less sensitive to high intensity female angry expressions compared to violent offenders and non-offenders, and less sensitive to high intensity female faces depicting disgust relative to non-offenders. For moderate intensity male faces, violent offenders showed a more conservative response style for fear compared with other emotions.

In examining recognition accuracy, Seidel et al. (2013) did not find a difference between sexually-violent offenders and non-sexually violent offenders across the five emotions studied (anger, disgust, fear, happiness and sadness).

Discussion

This review set out to explore facial affect processing in violent offenders and examine whether patterns of performance differ from that of non-violent offenders. It also looked at whether the inclusion or exclusion of sexually-violent offenders affected patterns observed in the violent sample. Seven published research studies investigating facial affect processing in populations of violent offenders were reviewed.

All studies observed some form of recognition impairment in violent offenders relative to non-offenders. Impairment was limited to negative emotional expressions; although the specific deficits observed varied between studies. Only two studies (Hoaken et al., 2007; Robinson et al., 2012) compared violent offenders (both of which included sexual

offenders) to non-violent offenders and one of these studies (Hoaken et al., 2007) reported greater deficits for violent offenders.

Of the three studies that included sex offenders in their violent sample, all found emotion recognition impairments in comparison to non-offenders (Hoaken et al., 2007; Robinson et al., 2012; Seidel et al., 2013). As well as finding impairments for fear, anger and sadness, impairments were found for the recognition of disgust in comparison to non-offenders; something which was not observed in samples of non-sexual violent offenders (Robinson et al., 2012; Seidel et al., 2013). Similarly, a response bias towards labelling a neutral expression as disgust was found in a violent/sexual-violent sample relative to non-violent offenders (Hoaken et al., 2007). In the one study that directly compared sexual offenders and violent offenders to non-offending controls, both offender groups showed deficits for fear recognition in comparison to non-offenders, and sex offenders were also less sensitive to recognising disgust compared to non-offenders (Gillespie, Rotshtein, Satherley et al., 2015).

As few studies explored the same combination of comparator and outcome variables, the ability to examine trends across research is limited. Further still, the studies varied in their sampling of psychiatric diagnoses, their matching of groups on demographic variables, and the stimulus set employed. With this in mind, the aggregation of these data provides only a coarse estimate of recognition deficits. In efforts to determine whether differences observed across studies reflect differences owing to the methodological dimensions highlighted, or whether inconsistencies continue to exist that cannot be explained solely by methodological variation, results were reviewed according to the recognition parameter studied.

Comparisons of violent offenders and non-offenders

Accuracy

This question was concerned with the facial affect recognition abilities of violent offenders compared to non-offenders. The studies that found reduced recognition accuracy in violent offenders reported deficits for the recognition of disgust compared to non-offending controls (Hoaken et al., 2007; Robinson et al., 2012; Seidel et al., 2013). It is noted, however, that Seidel and colleagues did not examine the expression of surprise, which was found to be impaired in antisocial samples in Marsh and Blair's (2008) meta-analysis. One of the studies reviewed here also reported impaired recognition of sadness, anger and fear (Robinson et al., 2012). Thus, there was evidence that violent offenders were less accurate in recognising negative emotion relative to non-offenders, with deficits in disgust recognition being most consistently reported. Deficits in disgust recognition were observed across different stimulus sets, duration of stimulus presentation, and response format (that is, including or excluding a neutral option). Furthermore, deficits were found in a sample containing medium-high scorers on psychopathy, in which 72% had cluster B personality disorders (Seidel et al., 2013), as well as in samples where no such pathology was reported (Hoaken et al., 2007; Robinson et al., 2012). This is noteworthy given research showing specific deficits in disgust recognition in a sample of criminal psychopaths (Kosson, Suchy, Mayer & Libby, 2002).

The only studies that did not find deficits in recognition accuracy for violent offenders in comparison to non-offending controls excluded sex offenders from their sample of violent offenders (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014). Although tentative, this could suggest that recognition accuracy is not similarly impaired across sexually-violent and non-sexually violent offenders. This proposal is strengthened by the findings from one

study which showed that sensitivity to emotional expressions was more impaired among sexual offenders relative to non-sexual violent offenders (Gillespie, Rotshtein, Satherley et al., 2015), and, similarly, by the research of Hudson et al. (1993) who found reduced accuracy and sensitivity to emotion recognition among sex offenders relative to violent offenders (although this study did not satisfy quality assessment for the current review). It is noted, however, that Schönenberg, Christian et al. (2014) sequentially presented stimuli of increasing intensity in increments of 2% and measured accuracy based on the error rates across the affective categories. It is possible that this more sensitive design attuned participants to subtleties in emotional expression, thereby compensating for any differences in accuracy that may have been observed had target expressions been presented in isolation. It is further noteworthy that, although not explicitly stated, there is some indication that Schönenberg, Christian et al.'s (2014) sample of 'antisocial violent offenders' may have met criteria for ASPD (as reported in Schönenberg & Jusyte, 2014), and that all of the offenders had elevated psychopathic tendencies. Moreover, all violent offenders in the study of Schönenberg et al. (2013) met criteria for ASPD. However, the exclusive sampling of individuals with antisocial and psychopathic traits would be unlikely to account for the absence of between group differences given that these traits have previously been found to be reliably associated with emotion recognition impairment (e.g., Dawel et al., 2012; Mash & Blair, 2008).

Sensitivity

Three studies looked at sensitivity to emotional expression among violent offenders (Schönenberg et al., 2013; Schönenberg, Christian et al., 2014; Gillespie, Rotshtein, Satherley et al., 2015). Consistent with findings of a marked impairment in fearful face recognition

among antisocial individuals (Marsh & Blair, 2008), two studies observed statistically reduced sensitivity to fear among violent offenders relative to non-offender controls (Gillespie, Rotshtein, Satherley et al., 2015; Schönenberg, Christian et al., 2014), while Schönenberg et al. (2013) found reduced sensitivity to fear on a trend level. Additional deficits in sensitivity to anger (Schönenberg et al., 2013) and surprise (Schönenberg, Christian et al. 2014) were found using a procedure whereby the intensity of expressions increased in increments of 2% from 0% through to 100%, whilst Gillespie, Rotshtein, Satherley et al. (2015) examined intensities of 10%, 55% and 90%. It is possible that the more sensitive design of Schönenberg et al. (2013) allowed more subtle differences in processing to be detected and for difficulties in discriminating between fear and surprise at an early perceptual level to be observed (Young et al., 1997). However, it is also noted that Schönenberg, Christian et al. (2014) exclusively sampled violent offenders with elevated psychopathic tendencies, which could account for the additional impairment since the emotion recognition abilities of psychopaths have been found to be impaired relative to non-psychopaths (Dawel et al., 2012). Moreover, it is important to bear in mind that the sample of Schönenberg, Christian et al. (2014) may have met criteria for ASPD, and that antisocial traits have been found to be associated with impaired recognition of surprise (Marsh & Blair, 2008).

Together, the findings suggest that violent offenders not only demonstrate reduced sensitivity to distress cues but also to threat/hostile cues. Impaired sensitivity to negative emotion is consistent with findings of impaired recognition accuracy for negative emotions in violent populations, and difficulties in this early stage of information processing (i.e., emotion recognition) could contribute to failures to interpret and appropriately respond to

others' cues (Blair, 2001; Gillespie, Rotshtein, Satherley et al., 2015; Marshall et al., 1995). Given that fear is the most acute distress cue (Marsh 2016; Preston & de Waal, 2002), reduced sensitivity to fearful expressions is likely to interfere with violent offenders' ability to inhibit the behaviour that is causing another individual harm (Blair, 2001; Hubble et al., 2015). Furthermore, since displays of anger serve as a signal of social punishment (Hubble et al., 2015; Schönenberg et al., 2013) reduced sensitivity to emotional displays of anger could interfere with violent offenders' ability to terminate socially unacceptable behaviour (Hubble et al., 2015). However, it is noteworthy that reduced sensitivity to anger was only observed in one study (Schönenberg et al., 2013), and that this study exclusively sampled offenders who had committed 'repeated' grievous bodily harm, thereby limiting the generalizability of reduced anger sensitivity to violent samples who do not demonstrate repeated violence. That findings of reduced sensitivity to anger were not replicated in the later work of Schönenberg and Jusyte (2014), who studied a range of violent offenders, would reinforce this proposal.

That deficits were not found for disgust when violent offenders were compared to non-offenders may be due to the fact that neither of these samples included sex offenders, unlike the studies reporting on recognition accuracy. Evidence for impaired disgust recognition among sex offenders is presented by Gillespie, Rotshtein, Satherley et al. (2015), who found impairments in the recognition of disgust in a sample of sexual offenders in comparison to non-offenders, whilst the same was not found for violent offenders relative to non-offenders. This study suggests more pervasive impairments in sensitivity to negative facial affect expression in sex of offenders.

Response bias

Violent offenders demonstrated a hostile attribution bias, in that they were more likely than non-offending controls to interpret ambiguous male emotional expressions involving proportions of anger as angry (Schönenberg & Jusyte, 2014). They also rated the perceived intensity of anger significantly greater than did the non-offenders. No negative bias was found for the happy-fearful dimension, suggesting that violent offenders do not show increased sensitivity to social threat or distress cues generally (Schönenberg & Jusyte, 2014). Moreover, when anger and fear were morphed together to create an ambiguous facial expression, the violent offenders continued to select the hostile interpretation over the threatening interpretation (Schönenberg & Jusyte, 2014). In a separate study, Schönenberg et al. (2013) found evidence for reduced sensitivity to anger in violent offenders compared with non-offenders. Thus, while violent offenders show reduced perceptual sensitivity to angry expressions, they show a greater tendency to interpret hostility in ambiguous hostile/threatening expressions; although, again, this conclusion is limited by the exclusive sampling of repeatedly violent offenders in the study of Schönenberg et al. (2013).

Although the hostile attribution bias for morphed expression of anger and fear could be interpreted in light of findings that violent offenders show reduced sensitivity to fear (Schönenberg, Christian et al., 2014) and are less likely to interpret fear in facial displays (Schönenberg, Christian et al., 2014; Gillespie, Rotshtein, Satherley et al., 2015), this would not explain the tendency for violent offenders to rate the perceived intensity of anger as significantly stronger than the non-offending controls, nor why the bias would hold in the angry-happy dimension. However, a separate study presents evidence for a negativity bias in emotion processing among depressed participants (Bishop, Dalgleish & Yule, 2004) which

comprised 10% of Schönenberg, Christian et al.'s (2014) sample. Caution is therefore warranted when interpreting and generalising findings of a hostile attribution bias among violent offenders without accounting for individual differences in depressive symptom severity. It is also of note that the stimuli in Schönenberg and Jusyte's (2014) study were presented for only 500ms and, given evidence to suggest that increased processing time increases the ability to interpret stimuli (e.g., Fenske et al., 2015; Neath & Itier, 2014), it is not clear whether this bias would be observed under longer processing times.

Although Schönenberg and Jusyte (2014) found a hostile attribution bias among violent offenders when decoding male emotional expressions, the extent to which a similar bias is present in decoding female emotional expressions is less clear. For example, there is evidence to suggest that the processing of threatening emotional stimuli differs according to the sex of the sender (Kret & de Gelder, 2013; Kret, Pichon, Grèzes & de Gelder, 2011) and, in keeping with this, Gillespie, Rotshtein, Satherley et al. (2015) found that violent offenders showed particular response biases when classifying the emotions of other males only.

Hoaken et al. (2007) did not find a similar bias toward attributing anger to neutral expressions (gender not specified), suggesting that the hostile bias could be limited to stimuli involving proportions of angry expressions (Schönenberg & Jusyte, 2014). In particular, they found that violent offenders were less likely to interpret a neutral face as sadness compared to non-offenders. This finding is interesting given that affective displays of sadness are said to be linked to the inhibition of aggressive behaviour (e.g., Miller & Eisenberg, 1988) and to prosocial responding (Marsh, Kozak & Ambady, 2007). Thus, while the findings of Hoaken et al. (2007) do not support a hostile attribution bias in violent offenders in comparison to non-offending controls, they did indicate less of a tendency to interpret states in ways that

facilitate prosocial behaviour. Additionally, the findings of Hoaken et al. (2007) provide further evidence of differential processing of facial expressions of sadness in antisocial populations (Marsh & Blair, 2008).

Somewhat in contrast to Hoaken et al. (2007), Gillespie, Rotshtein, Satherley et al. (2015) found that violent offenders were more liberal when labelling moderate intensity male faces as sad compared with fear and disgust, and compared to disgust and surprise at high intensities. This difference between studies could be attributable to a number of factors. For example, the more liberal response style found by Gillespie, Rotshtein, Satherley et al. (2015) might reflect difficulties among violent offenders in processing fear, disgust and surprise relative to expressions of sadness. Alternatively, this difference may reflect the fact that Hoaken et al. (2007) did not assess responses to male faces.

The finding of Gillespie, Rotshtein, Satherley et al. (2015) that violent offenders were more liberal in their labelling of sadness is consistent with the proposal of Gao and Maurer (2009) who highlight that individuals may be perceptually more sensitive to recognising sadness since sadness is often expressed at low intensities in social situations, whilst expressions of fear, disgust and anger are typically expressed at higher intensities. However, from this perspective, it is unclear why perceptual sensitivity to sadness would be observed among violent offenders only. Indeed, the mechanisms driving response biases and their role in offending behaviour are an important area for future research.

To summarise, there is evidence that violent offenders are less likely to interpret a male face as fearful compared to other emotions, less likely to interpret a neutral face as sadness, and more likely to interpret hostility under conditions of ambiguity in comparison to non-offenders. This latter finding is consistent with findings of a hostile attribution bias in

anger-prone and aggressive individuals (Crick & Dodge, 1996; Dodge, Price, Bachorowski & Newman, 1990; Mellentin et al., 2015). Regardless of the impairment driving these response biases, distorted processing of social information has been found to result in inappropriate social responses, including violent behaviour (e.g., Dodge, Laird, Lochman & Zelli, 2002). In line with this, bias modification training has been found to reduce aggressive behaviour in adolescents considered to be at high risk of committing crimes (Penton-Voak et al., 2013). Thus, it has been proposed that anger bias may be a cognitive pathway mediating interpersonal violence (Mellentin et al., 2015). Indeed, Hubble et al. (2015) note that a bias toward perceiving anger could put the individual at risk of anticipating dangerous or threatening situations, thereby stimulating a "fight" response. Furthermore, that violent offenders would be less likely to decode fear in a sender would interfere with the elicitation of affective responses such as empathy and remorse, which are theorised to mitigate aggression (Blair, 2001; Marsh & Ambady, 2007; Marsh & Blair, 2008).

Comparisons of offenders with and without a history of violence

Accuracy

Of the two studies that compared violent offenders to non-violent offenders (Hoaken et al., 2007; Robinson et al., 2012), one study found that, overall, violent offenders made more errors than did the non-violent offenders (Hoaken et al., 2007) (although, unfortunately, an analysis of the nature of these errors as a function of emotional expression was not conducted), and one study did not find a difference between the two groups of offenders (Robinson et al., 2012). The findings of Hoaken et al. (2007) are inconsistent with previous research showing violent offenders to be more emotionally sensitive and accurate at recognising emotion compared to non-violent offenders (Hudson et al., 1993). However,

unlike Hoaken et al. (2007), Hudson et al. (1993) did not include sex offenders in their violent sample. While it is possible that the deficits observed by Hoaken et al. (2007) reflect those of sex offenders, unfortunately this cannot be explored given a lack of information pertaining to sample composition.

Similarly, in terms of interpreting differences in recognition accuracy observed among the reviewed studies, it is noted that Hoaken et al. (2007) categorised non-contact sexual offenders as non-violent, where as Robinson et al. (2012) categorized all sexual offenders as violent. The inclusion of non-contact sexual offenders in the violent sample would likely affect the between-group differences observed; although, again, a lack of information pertaining to sample composition precludes understandings about the impact of this confounding variable. It is further noteworthy that Hoaken et al. (2007) examined group differences in overall accuracy (i.e., collapsed across emotion), while Robinson et al. (2012) explored group differences for each emotion; and therefore differences could be an artefact of statistical analyses. Finally, the differences observed across studies could reflect differences in presentation delivery with stimuli presented for three seconds longer (five seconds relative to two seconds) by Robinson et al. (2012) compared to Hoaken et al. (2007). Previous research has indicated that duration of stimulus presentation affects emotion recognition, with the longer presentation increasing recognition (Fenske et al., 2015; Neath & Itier, 2014). Thus, it is possible that the longer viewing times employed by Robinson et al. (2012) may have diminished any between group differences that would have been observed under more restricted viewing times.

Sensitivity

None of the studies reviewed examined sensitivity impairments across groups of violent and non-violent offenders.

Response bias

Only one study looked at response bias in violent compared to non-violent offenders (Hoaken et al., 2007). This study found that violent offenders were more likely to interpret a neutral face as disgust relative to non-violent offenders. Disgust is conceptualised as a heterogeneous construct underpinned by dissociable mechanisms (Luo et al., 2013). As well as its links with contamination avoidance, disgust also helps one to avoid social and moral transgressions (Rozin, Haidt & McCauley, 2008). Disgust in this form (known as "moral disgust", Chapman, Kim, Susskind & Anderson, 2009; Rozin, Haidt & McCauley, 2000) is associated with feelings of shame and rejection and research has shown it to be implicated in the breakdown of relationships (Gottman & Levenson, 2002). This finding therefore demonstrates a tendency for violent offenders to interpret states of others in ways that have harmful consequences for interpersonal relationships. As Hoaken et al. (2007) included sexual offenders in both groups of offenders (i.e., contact versus non-contact offending), these results are likely specific to violent offenders irrespective of sexual motives for offending.

How does the study of sex offenders affect patterns of performance observed in violent offenders?

Variability across comparison groups and outcome measures used precludes reliable comparison of findings as a function of the inclusion or exclusion of sex offenders. At a

rudimentary level, this review raises the possibility that the exclusion of sex offenders from the violent sample may affect whether deficits in recognition accuracy are observed in comparison to non-offenders. Notably, this proposal is merely based on the absence of between-group differences in two studies wherein IPV offenders were also excluded from the sample (Schönenberg et al., 2013; Schönenberg, Christian et al. 2014). The exclusion of sex offenders did not tend to affect whether deficits in sensitivity or response biases were observed in comparison to non-offenders. Unfortunately, however, given that none of the studies which excluded sex offenders from the violent sample used a non-violent offender comparison group, it cannot be said whether the same applies when comparing violent offenders to non-violent offenders.

In terms of the nature of impairment observed, deficits in the recognition of disgust were most consistently reported in samples which included sex offenders, and, in line with this, studies that excluded sex offenders from their sample of violent offenders did not report deficits in the recognition of disgust in comparison to controls. However, one study did find evidence of a more conservative response style for classifying male faces as disgust relative to a number of other emotions in a sample of non-sexual violent offenders (Gillespie, Rotshtein, Satherley et al., 2015).

The most informative studies in answering this question are those which compared samples of sexual offenders and non-sexual violent offenders to non-offending controls. Using this design, Gillespie, Rotshtein, Satherley et al. (2015) found that sexual offenders showed more pervasive deficits in comparison to that observed in non-sexual violent offenders. Specifically, both types of violent offender were less sensitive to the recognition of fear compared to non-offenders, whilst sexual offenders also showed reduced sensitivity to

disgust relative to non-offenders, and to female anger expressions at high intensities relative to both non-offenders and violent offenders. In contrast, in examining recognition accuracy, Seidel et al. (2013) did not find any differences between violent offenders and sexually-violent offenders, with both types of offender therefore exhibiting similar impairments in the recognition of disgust relative to non-offenders.

Overall, the research reviewed suggests that sexual offenders do tend to demonstrate subtle differences in facial affect processing relative their non-sexual violent counterparts. However, the exact nature of these differences is not clear and substantiates the need for further research in this area. This review highlighted a dearth of research exploring facial affect recognition in specific samples of IPV offenders. The subtleties in facial affect recognition observed between sexual and non-sexual violent offenders raise questions about whether IPV offenders would demonstrate their own idiosyncratic patterns of facial affect processing, and is something which also needs addressing in further research.

At present, a lack of understanding about the mechanisms underpinning recognition deficits in populations of offenders precludes understandings about whether, and indeed why, deficits may be associated with particular forms of violent offending. As suggested by Gillespie, Rotshtein, Satherley et al. (2015), it is possible that differences in social cognition relate to differences in personality characteristics. Indeed, a wide body of literature has demonstrated a link between personality variables and emotion processing; including psychopathic traits (Blair et al., 2004; Blair, Colledge, Murray & Mitchell, 2001; Stevens, Charman & Blair, 2001), borderline traits (Bland, Williams, Scharer & Manning, 2004; Daros, Zakzanis & Ruocco, 2013; Domes et al., 2009; Dyck et al., 2009; Lynch et al., 2006), depression (e.g., Brotman et al., 2004; Demenescu et al., 2010) and anxiety (e.g., Buckner,

Maner & Schmidt, 2010; Easter et al., 2005). In addition to being associated with violent offending, including IPV, such variables have been found to differ among groups of offenders. For example, child molesters have been found to have high levels of social phobia in comparison to other groups of offenders (e.g., McElroy et al., 1999; Raymond, Coleman, Ohlerking, Christenson & Miner, 1999), while high levels of depression and borderline traits have been observed among groups of IPV perpetrators (e.g., Holtzworth-Munroe et al., 2000; Maiuro, Cahn, Vitaliano, Wagner and Zegree, 1988; Ruiz-Hernández, García-Jiménez, Llor-Esteban & Godoy-Fernández, 2015). Such findings provide a basis upon which to explore how patterns of socio-cognitive performance among groups of violent offenders may relate to differences in the personality profiles of offenders.

In this review, specific deficits observed appeared to differ as a function of the recognition measure investigated. Specifically, in terms of accuracy, deficits in violent offenders' recognition of disgust was most reliably reported, whilst impoverished sensitivity to fear expressions was most reliably reported. This could reflect sampling differences that varied alongside these outcomes, since sex offenders were generally included in the studies examining accuracy and were excluded in the studies examining sensitivity. Alternatively, it could reflect different processing requirements of the task and the nature of perceptual and cognitive processing required to correctly decode the emotion. This proposal is tentative and further research comparing both recognition accuracy and sensitivity in the same sample is needed to elucidate whether different deficits are observed for the two parameters. Indeed, previous research has demonstrated how the nature of the task effects the processing of facial affective information (Smith & Merlusca, 2014).

Across experimental and control groups, participants typically recognised expressions of happiness and sadness with greater accuracy than fear, disgust or surprise. This is consistent with research demonstrating that the brain integrates expression-specific information, and that these expressions are the most easily discriminated on the basis of unique characteristics (e.g., the upturned lips and revealing of teeth in the happy expression) (Schyns et al., 2007, 2009; van Rijsbergen & Schyns, 2009). Moreover, particular facial features have been found to provide the most diagnostic information for distinguishing between facial displays of emotion. For example, the eyes have been shown to be the most information-rich feature for decoding fear and anger, the nose for disgust, and the mouth for happiness and surprise (Smith et al., 2005).

Perhaps not surprisingly, decoding of facial affect has been found to be enhanced when attention is directed to the emotionally-salient parts of the expression (e.g., Eisenbarth & Alpers, 2011). In line with this, studies have shown that attention to emotionally-salient parts of the face may be compromised in populations demonstrating impaired facial affect recognition. For example, Dadds et al. (2006) found that instructing children with callous-unemotional traits to look at the eye region of facial displays temporarily improved emotion recognition impairment, and more recent research using eye-tracking techniques has confirmed that callous-unemotional and psychopathic traits are associated with reduced attention to the eyes (Dadds et al., 2008; Gillespie, Rotshtein, Wells et al., 2015). However, Schönenberg, Christian et al. (2014) found that priming violent offenders high in psychopathy to attend to the eye-region of fearful cues was successful in improving overall emotion recognition, but only when the intensity of the fearful cue was successively reduced over the course of training. A more recent study found that a training approach encouraging

juvenile offenders to attend to the salient features of happy, sad, angry and fear expressions was successful in improving recognition of these particular expressions but improvements did not generalise to the recognition of non-trained expressions; although notably only disgust was included as an extra emotion (Hubble et al., 2015). Hubble et al. (2015) found that, relative to those who received treatment as usual, offenders who undertook recognition training showed a significant reduction in the severity of offending behaviour over the following six months.

While the aforementioned findings provide evidence for emotion recognition training being a promising avenue of intervention in violent offenders, it remains unclear how such improvements are attained (Hubble et al., 2015). As such, the role of attention to facial features on recognition accuracy, as well as how this may relate to levels of psychopathology and expression type and intensity, requires further exploration in populations of violent offenders in order for the efficacy of training approaches to be maximised.

Findings of impaired recognition of fear in violent offenders is in keeping with Marsh & Blair's (2008) meta-analysis that found a robust link between antisocial behaviour and reduced accuracy for fear recognition. However, although deficits were greatest for the recognition of fear, unlike the present review, they also found deficits in recognising expressions of sadness and surprise. Furthermore, deficits in disgust were not reliably reported. Although difficult to conclude that there are true differences due to the small number of studies included in the present review, there are some important differences between the two reviews worth noting. Specifically, incarcerated populations were included in the current review and it can be reasonably assumed that the relationship between antisociality and emotion recognition would vary according to the severity of antisocial

behaviour studied. Additionally, the differences could be attributable to the inclusion of sex offenders in the current review, particularly relating to deficits in disgust recognition. That the recognition of sadness was not reliably impaired among violent offenders could suggest impoverished recognition of threat-related cues as opposed to distress cues more generally among incarcerated individuals; although it is unclear why this would be the case given that similar neural structures are implicated in the processing of both fear and sadness (Adolphs & Tranel, 2004; Blair, Morris, Frith, Perrett & Dolan, 1999). Unfortunately, the current review does not allow one to determine whether the different findings are due to the type or severity of antisocial behaviour (i.e., a focus on violent behaviour specifically or a focus on incarcerated populations).

Limitations

This review is based on a small number of studies that utilised relatively small sample sizes. Not all studies assessed for the presence of clinical or antisocial pathology in their sample and some included a number of psychological disorders, including personality disorder, depression, and psychopathy. The inconsistent sampling of clinical pathologies renders it difficult to reliably aggregate and explore findings across studies. Moreover, it is difficult to determine to what extent the findings are attributable to psychopathology, violent offending, or both. The failure of some studies to assess for psychopathy (Hoaken et al., 2007 and Robinson et al., 2012) is particularly concerning given that psychopathic traits are associated with impaired facial expression recognition (Blair et al., 2004; Dawel et al., 2012; Kosson et al., 2002; Dolan & Fullam, 2006; Gillespie, Mitchell, Satherley, Beech & Rotshtein, 2015; Montagne et al., 2005).

The validity of the conclusions drawn from this review is contingent upon a representative sample of all research conducted in this area being examined. The inclusion and exclusion criteria applied means that only a subset of studies investigating emotion recognition in violent offending were examined. The review did not include participants from psychiatric populations or female samples, which limits the generalisability of the findings beyond men incarcerated for a violent offence. The review specifically explored emotion recognition using static displays of facial affect. Whilst facial expressions convey important information about emotional experience and are central to social communication (Mellentin et al., 2015), facial affect recognition is just one part of social information processing and thus the findings should not be generalised to emotion recognition abilities more generally. Furthermore, despite efforts to identify relevant studies, some may have been missed. Finally, the inclusion of only published studies means that the findings may have been affected by publication bias or a 'file drawer' effect, given that papers reporting positive results are more often published.

Conclusion

In conclusion, this review found evidence of impaired facial affect processing among violent offenders. Deficits were found in comparison to both non-violent offenders and non-offenders. The impairment was not generalised but specific to negative emotion, with deficits in fear, anger and disgust being most reliably reported. There was some indication that the deficits varied according to the recognition outcome under investigation. These deficits cannot be explained by task difficulty since outcomes are relative to the performance of controls on each expression. There was also evidence to suggest that violent offenders show a tendency towards interpreting ambiguous displays in ways which have harmful consequences

for interpersonal relationships. In particular, violent offenders were less likely to interpret fear in high intensity male faces and showed a bias towards perceiving anger in ambiguous stimuli containing proportions of angry expression. However, violent offenders showed reduced perceptual sensitivity to anger. Furthermore, violent participants were less likely to interpret a neutral face as sadness despite making more sad responses to moderate intensity male displays relative to fear or disgust. Hence, a complex pattern between response bias and recognition deficits could mediate the relationship of social-cognitive functioning with aggressive behaviour. The review found some evidence to suggest that that the exclusion of sex offenders from violent samples could affect whether deficits in recognition accuracy are observed in relation to controls, and studies that included sex offenders more often found deficits in disgust recognition. Finally, there was some evidence to suggest that specific deficits observed may be dependent on the sex and intensity of the expression.

These results suggest that impaired facial affect recognition represents a key treatment target for violent offenders. However, a greater understanding of the potential mechanisms underlying these impairments is necessary to form an understanding of how these impairments may be modified, and to inform the development of successful training-initiatives (Hubble et al., 2015).

Chapter Three

Facial affect processing in Intimate Partner Violent (IPV) and non-Intimate Partner Violent (non-IPV) prisoners: Exploring the role of eye-scan paths as a mechanism underlying recognition deficits

Abstract

Impairments in facial affect recognition are associated with violent offending, including Intimate Partner Violence (IPV). Abnormal visual scanning behaviour, including reduced attention to salient facial features, has been noted in relation to some of the psychopathologies commonly characterising IPV. These findings provide a foundation upon which to explore whether one mechanism underpinning facial affect recognition impairments in IPV is deficient eye-scan paths when viewing emotional faces. To investigate this issue, the current study examined eye-scan paths and facial affect recognition of 30 IPV prisoners, 28 non-IPV violent prisoners and 27 non-offending controls. Number of fixations and dwell time on the eyes and mouth of facial expressions were recorded in participants' viewing of the six basic emotions expressed by male and female faces at varying levels of intensity. The influence of psychopathology on eye-scan paths and recognition accuracy was also examined. Although groups did not differ in recognition accuracy, differences in visual scanning behaviour were observed according to sex and intensity of the expression. In particular, both groups of violent offenders tended to rely more on the mouths of expressions when emotional decoding was more difficult relative to when it was easier in comparison to non-offenders. Moreover, non-offenders made comparatively more fixations to the eyes of female expressions than to male expressions than did IPV and non-IPV offenders, who showed the opposite fixation pattern, and non-IPV offenders looked comparatively more at the mouths of female expressions than did non-offenders. Individual differences in psychopathology were not found to be related to eye-scan paths or to emotion recognition accuracy after controlling for inflated Type I error. The totality of the findings demonstrate similarity in the facial affect processing of IPV and non-IPV offenders and suggest that abnormal visual processing may

be a mechanism underpinning recognition deficits in violent offenders. The findings highlight the potential efficacy of developing recognition training initiatives which promote more efficacious attentional deployment in the viewing of female faces and low intensity expressions, rather than a focus on emotion-specific features per se. Further research is needed to elucidate the processes underpinning eye-scan paths in IPV and non-IPV offenders and their role in driving recognition impairments.

Introduction

The previous chapter reviewed research examining facial affect processing in violent offenders. The review found evidence for impaired recognition abilities in violent offenders relative to non-violent offenders and non-offending controls, particularly in the recognition of negative affect. However, three primary issues were identified. The first related to a dearth of research exploring facial affect processing in IPV prisoners. The second concerned a lack of understanding about how different patterns of facial affect impairment may put an individual at risk of one form of violent behaviour over another. Finally, the third concerned a lack of knowledge about the mechanisms underlying facial affect impairment in violent samples.

This chapter aims to address this gap in understanding by presenting a study exploring the following interrelated aspects:

1. Whether IPV prisoners demonstrate a different pattern of facial affect impairment to non-IPV violent prisoners

2. The role of abnormal eye-scan paths as a mechanism underpinning recognition deficits

3. How patterns of facial affect processing relate to personality variables that are implicated in violent offending

The ability to accurately decode another individual's emotional experience is fundamental to understanding the emotional consequences of behaviour on others (Farrington, 1998), and, as such, is considered as a prerequisite to empathy (Marshall et al., 1995). Conversely, scholars have proposed that deficits in emotion recognition have the potential to drive

cascading deficits in empathy (e.g., Dadds et al., 2014) and could serve to facilitate harmful behaviour (Jolliffe & Farrington, 2004; Kirsch & Becker, 2007).

Owing to the universality of at least six basic facial displays of emotion across cultures (Ekman & Friesen, 1971), facial expressions are considered to be a reliable channel for communicating affective information (Clements & Schumacher, 2010; Hess et al., 1988) and as the access point to understanding human emotional experience (Niedenthal & Brauer, 2012). Consequently, the ability to recognise and understand others' emotion is largely contingent upon the ability to accurately decode facial affect (Romero-Martínez, Lila & Moya-Albiol, 2016).

In line with this, studies have shown empathic capacity to be inversely correlated with facial affect recognition in both offending and non-offending samples (Carr & Lutjemeier, 2005; Gery et al., 2009; Romero-Martínez, Lila, Martínez et al., 2016), and improvements in facial affect recognition have been found to correspond to reductions in violent conduct (Hubble et al., 2015; Penton-Voak et al., 2013). Together, such findings highlight that deficits in facial expression recognition are critically implicated in violent offending and may be an obstacle to achieving empathy in violent offenders (e.g., Carr & Lutjemeier, 2005; Clements & Schumacher, 2010).

Not all emotional expressions play a similar role in empathy (Marsh, 2016). Rather, empathy is primarily fostered in response to another's distress (Blair, 2001; Marsh, 2016; Nichols, 2001). Fear expressions are believed to signal the most acute and urgent distress (Marsh 2016; Preston & de Waal, 2002) and the facial configurations of fear expressions resemble infantile features (i.e., big, round eyes, raised eye brows; Hammer & Marsh, 2015; Marsh, Adams & Kleck, 2005). As such, fear expressions serve to communicate vulnerability

rather than aggression (Marsh et al., 2007) and are theorised to be most heavily implicated in inhibiting harmful behaviour and motivating prosocial responding (Blair, 2001; Marsh, 2016). Indeed, facial fear recognition accuracy has been found to predict participants' donations of time and money to a woman in distress (Marsh et al., 2007), thereby supporting the role of fear recognition in facilitating prosocial behaviour.

Problems in perceiving another individual's distress not only have implications for prosocial responding, but also render it unlikely that distress signals would be successful in inhibiting harmful behaviour (Blair, 2001; Gery et al., 2009). Furthermore, Frick and Marsee (2006) highlight that a failure to perceive distress cues as aversive has implications for classical conditional learning; where distress cues are typically paired with representations of the transgression that resulted in distress, thereby serving to deter future harmful behaviour. Indeed, impaired fear recognition is found among antisocial populations, including violent offenders and psychopaths, at a significantly higher frequency and magnitude than deficits for any other emotion (e.g., Marsh & Blair, 2008); and deficits in fear recognition have been found to relate to both violence perpetration and impoverished empathy among offenders (Carr & Lutjemeier, 2005).

Although efforts have been made to elucidate the mechanisms driving impaired facial affect recognition in violent offenders, the origins of these deficits remain largely elusive (Marsh, 2016). One promising line of enquiry focuses on visual scanning behaviour, in particular a breakdown in directing attention to salient facial features. This proposal draws on the role of the amygdala in directing attention to salient information (Adolphs, 2008; Anderson & Phelps, 2001), coupled with its role in recognising and responding to fear (Adolphs et al., 1999; Fusar-Poli et al., 2009). However, eye-scan paths are yet to be explored

in any detail in violent offenders. Moreover, there is a dearth of research exploring the link between eye-scan paths and a number of personality pathologies commonly implicated in both violent offending and emotion recognition. Such questions are important not only in understanding the modifiability of the recognition impairment, but also for developing insights into why particular patterns of impairment may be observed among different types of offenders (Gillespie, Rotshtein, Satherley et al., 2015). These issues are discussed in the succeeding review.

Different patterns of facial affect processing among offender groups

As identified in the preceding chapter, specific patterns of recognition deficits may vary according to the nature of offending behaviour. For example, Hoaken et al. (2007) found that violent offenders demonstrated greater impairments in facial affect recognition than did non-violent offenders, while other studies have found that sexual offenders demonstrate more impoverished recognition in comparison to those seen in non-sexual violent offenders (Gillespie, Rotshtein, Satherley et al., 2015; Hudson et al., 1993) and to those seen in non-violent offenders (Gery et al., 2009). Such findings raise the possibility that IPV offenders could demonstrate their own idiosyncratic patterns of processing impairments relative to non-IPV violent offenders. Yet previous research has not distinguished violent offenders on the basis of their IPV perpetration.

Facial affect recognition in IPV

In the context of an intimate relationship, a man's problems in understanding his partner's emotional experiences have been found to be linked to both partners' IPV perpetration (Cohen et al., 2015). Indeed, although somewhat scarce relative to the general

violence literature, there is evidence to suggest that IPV perpetrators are poor at decoding the facial affect of both strangers' and partners', relative to non-violent controls.

In a series of studies utilising the 'Eyes Test' (Baron-Cohen et al., 2001), in which participants are required to discern the mental states of others using just the eyes of facial stimuli, Romero and colleagues found that IPV men were impaired in understanding the thoughts and feelings of others relative to their non-violent counterparts, particularly in the decoding of neutral displays (Romero-Martínez, Lila, Catalá-Miñana et al., 2013; Romero-Martínez, Lila & Martínez et al., 2016; Romero-Martínez, Lila & Moya-Albiol, 2016; Romero-Martínez, Lila, Sariñana-González et al., 2013).

A more ecologically valid test of IPV abusers' emotion recognition abilities is provided through studying their ability to discern emotion from entire facial configurations of the six basic emotional expressions. Studies that have examined facial affect recognition in this way have also found recognition deficits to be associated with IPV.

In particular, Babcock, Green, and Webb (2008) presented stimuli for 10 seconds, during which time participants were required to indicate which of seven expressions (six emotional categories plus neutral) was displayed. The authors found that IPV men (identified using male and partner reports from CTS2 as having perpetrated IPV within the past year) made more errors in decoding disgust and neutral expressions than did their non-IPV counterparts. These expressions were usually interpreted as displays of hostility, an attribution bias which has been proposed to trigger escalation toward violence (e.g., Dodge et al., 1990).

A later study by Marshall and Holtzworth-Munroe (2010) used a dimensional approach to exploring IPV men's recognition of both wives' and strangers' expressions of five emotions plus neutral (surprise was not tested). IPV perpetration within the preceding year was assessed using the CTS2 and scored according to severity and frequency. Participants were required to label the expression presented as quickly as possible by selecting one of two emotional responses (each combination of emotion pairs was presented throughout the testing blocks). The authors found that IPV perpetration was associated with reduced sensitivity to wives' and unfamiliar females' expressions of fear and to wives' expressions of happiness. In interpreting this finding it is important to note that the study's recruitment strategy included targeting couples who were "experiencing problems and severe arguments" and "considering divorce". Given that research has found men's marital satisfaction to be associated with recognition of wives' positive emotion (Cohen, Schulz, Weiss & Waldinger, 2012), the deficits observed by Marshall and Holtzworth-Munroe (2010) may be biased by an over-representation of men perpetrating IPV in the context of relationship dissatisfaction.

In summary, while the preceding studies provide evidence for facial affect recognition deficits among IPV men, the nature of these deficits remains largely unclear. Disparity in recruitment strategy, stimuli employed, number of emotional categories assessed, stimuli presentation time, response format, and statistical analyses renders it difficult to synthesise findings coherently.

Relevance of psychopathology to facial affect recognition

In line with proposals of heterogeneity among IPV perpetrators (e.g., Holtzworth-Munroe et al., 2000; Holtzworth-Munroe & Stuart, 1994), patterns of facial affect recognition

impairment have been found to differ according to abusers' level of psychopathology and severity of violence perpetration. For example, Babcock et al. (2008) subsequently analysed errors in emotion recognition according to Holtzworth-Munroe and Stuart's (1994) batterer typology. This approach classifies IPV perpetrators along dimensions of severity of violence, generality of violence and psychopathology, yielding three subtypes of abusers commonly described in the literature: *family-only* (FO; low violence severity, low psychopathology), *borderline dysphoric* (BD; moderate/severe violence, high borderline/dysphoric characteristics and psychological distress) and *generally violent and antisocial* (GVA; high severity and generality of violence, high antisocial and psychopathic traits). When Babcock et al. (2008) compared GVA abusers to BD abusers, the former showed impairments in the recognition of angry, happy, neutral, and surprised faces relative to the latter.

Marshall and Holtzworth-Munroe (2010) adopted a dimensional approach in studying two variables relevant to IPV typologies. In particular, they examined recognition abilities in relation to levels of psychopathic and borderline/dysphoric characteristics (the latter indexed by depressive symptomology, borderline and dependent personality pathology and an anxious attachment style). The authors found a relationship between borderline/dysphoric characteristics and reduced sensitivity to wives' expressions of happiness, and that reduced sensitivity to happiness partially mediated the relationship between borderline/dysphoric traits and IPV. They also found that psychopathy was related to a tendency to misinterpret fear as neutral; although, diminished sensitivity to fear mediated the relationship between psychopathy and IPV at a sub-significant level. Similarly, a recent study by Romero-Martínez, Lila and Moya-Albiol (2016) found antisocial and borderline traits were negatively related to IPV men's ability to discern emotion using just the eyes of emotional expressions

(although specific deficits were not studied), and that recognition abilities moderated the relationship between these personality traits and risk of recidivism.

Such findings highlight the relevance of personality pathology in influencing emotional decoding among IPV perpetrators, and are consistent with literature showing recognition deficits in relation to psychopathology in other populations. Doubtlessly the most well-documented recognition deficit in the realm of psychopathology is that seen in psychopathy; with studies finding fear recognition deficits in relation to psychopathic traits in offenders and non-offenders (Blair et al., 2001; Blair et al., 2004; Dadds et al., 2006; Dawel et al., 2012; Dolan & Fullam, 2006; Gillespie, Mitchell, et al., 2015; Montagne et al., 2005). Although less conclusive than the psychopathic trait-related deficit, deficits in facial affect recognition have also been documented in relation to anxiety, depression, and borderline traits in non-offending samples.

Studies have shown a hyper-vigilance to threatening information among anxious samples (e.g., Mogg & Bradley, 2005) and a tendency to interpret neutral displays as negative (Bishop, 2007). Moreover, Surcinelli and colleagues found that individuals high in trait anxiety were better at recognising fear than were individuals low in trait anxiety (Surcinelli, Codispoti, Montebarocci, Rossi, Baldaro, 2006). However, this was not replicated in a later study by Cooper, Rowe and Penton-Voak (2008). Although enhanced recognition of fear remains unclear, a meta-analytic review exploring overall emotion recognition abilities found a moderate recognition impairment in adults with anxiety disorders (Demenescu et al., 2010).

In terms of depressive symptomology, some studies have found specific deficits for happy faces and a tendency to interpret negativity in depressed samples (e.g., Gur et al., 1992; Joormann & Gotlib, 2006; Surguladze et al., 2004; Yoon, Joormann & Gotlib, 2009),

while other studies have observed a generalised deficit in emotion recognition (e.g., Cooley & Nowicki, 1989; Langenecker et al., 2005; Persad & Polivy, 1993). In a meta-analytic review of eight studies examining overall recognition deficits, Demenescu et al. (2010) found a moderate recognition impairment in adults with major depression.

With respect to borderline personality traits, Domes et al. (2009) carried out a review of the literature and concluded that individuals with BPD may show subtle deficits in emotion recognition and a tendency to interpret negative emotion in neutral faces. More recently, Daros et al. (2013) conducted a meta-analysis of 10 studies, comprising a sample of 266 BPD participants and 255 controls. The authors found that, overall, BPD patients were impaired at recognising emotion relative to non-BPD participants, and demonstrated specific deficits in the recognition of angry and disgust facial expressions.

In addition to such psychopathologies being characteristic of IPV perpetrators (e.g., Askeland & Heir, 2014; Dutton, 1995; Holtzworth-Munroe et al., 2000; Robertson & Murachver, 2007; Shorey, Febres, Brasfield & Stuart, 2012; Stuart et al. 2008), they have also been implicated in general violence and sexual offending (see Skodal, 1998). However, levels of psychopathology may differ between these groups of offenders. Support for this comes from the finding that child molesters have high levels of social phobia in comparison to other groups of offenders (McElroy et al., 1999; Raymond et al., 1999), while IPV offenders have been found to have higher rates of depression relative to non-IPV violent offenders (e.g., Maiuro et al., 1988). Together, the findings summarised suggest that personality variables and psychopathology may be relevant to understanding different patterns of recognition impairment between groups of offenders (Gillespie, Rotshtein, Satherley et al., 2015).

The need for extensions in IPV research

To date, research exploring facial affect recognition in IPV has utilised community samples of IPV perpetrators. Given that severe IPV may be associated with different constellations of risk factors to non-severe IPV (e.g., Pascual-Leone et al., 2011; Slep et al., 2015), including different levels of psychopathology (e.g., García-Juménez et al., 2014; Holtzworth-Munroe & Stuart, 1994; Pan et al., 1994), emotion recognition deficits may manifest differently in incarcerated abusers. It is therefore important that research focuses on elucidating the facial affect recognition deficits of prison samples of abusers due to their presenting the highest level of risk (Andrews et al. 1990; Pascual-Leone et al., 2011).

A further issue, reflecting the realm of IPV research more generally, is that research has often been devoted to exploring differences between subgroups of IPV abusers, and what seems to have emerged is a lack of understanding about how IPV offenders differ from other types of offenders. Although typologies of IPV perpetrators are well-recognised by scholars, such classifications are seldom adopted in practice. Rather, violent offenders are recommended treatment based on the perpetrator-victim relationship and not on on the basis of the offender's psychopathological profile; a distinction governed by the prevailing but empirically-lacking conviction that IPV is a unique form of violence.

With an ever-increasing number of offenders mandated to custodial treatment and a limited pool of resources, together with poor treatment efficacy for current approaches to IPV, it is important that research makes more efforts to uncover whether and how the treatment needs of IPV prisoners differ to those of non-IPV prisoners, rather than to each other. Such questions have important implications for the continued treatment of IPV as a special form of violence warranting specialist intervention and raise the possibility that there

may be more efficient ways of treating violent offenders through targeting shared risk factors (Fagan & Browne, 1994; Klevens et al., 2012; Piquero et al., 2014).

In increasing understandings of similarities and differences in IPV and non-IPV violent offenders, it is important to move beyond the level of correlates to an exploration of the mechanisms underlying these (Moffitt et al., 2000). In particular, studying recognition impairment and underlying processes together could elucidate a unique mechanism underlying impairment in one group of offenders that could not be inferred from studying recognition impairment alone. Alternatively, should similarities exist in underlying mechanisms then treatment targeting common mechanisms should be effective in treating both forms of violence (Klevens et al., 2012).

Eye-scan paths

The eyes are typically conceived as the most important facial feature for decoding emotion (e.g., Cline, 1967; Emery, 2000; Gibson & Pick, 1963; Yoon, Kim, Kim, Lee & Lee, 2016), though it is widely acknowledged that they are of more relevance to the categorisation of some emotions than others (e.g., Eisenbarth & Alpers, 2011). In particular, the eyes have been found to be the most information-rich feature for decoding fear and anger, while the mouth is the more emotionally-salient feature for decoding happiness and surprise (Schyns et al., 2007, 2009; Smith et al., 2005; van Rijsbergen & Schyns, 2009).

Supporting the work of Schyns and colleagues, a recent study found that training-related improvements in facial affect recognition in children coincided with increased dwell times on the eyes of fearful and sad faces and on the mouths of happy faces (Pollux et al., 2014). Similarly, Hubble et al. (2015) found that a training approach encouraging juvenile

offenders to attend to the emotionally-salient features of happy, sad, angry and fear expressions was successful in improving recognition of these particular expressions, but improvements did not generalise to non-trained expressions. Conversely, however, Schönenberg, Christian et al. (2014) found that priming violent offenders to attend to the eye-region of fearful faces was successful in improving overall emotion recognition, but only when the intensity of the fearful cue was reduced over the course of training. Moreover, a study by Vaidya et al. (2014) found that attention to facial features only predicted successful decoding of low intensity emotional expressions and high intensity fear expressions, which, as noted by Vaidya et al. (2014), suggests that attention to salient features may be most relevant to recognition when emotion categorisation is more difficult.

Although the aforementioned findings provide support for the efficacy of recognition training initiatives centred on principles of attentional deployment, disparity in the benefits observed is testament to the fact that the elements responsible for bringing about recognition enhancements are somewhat unclear. Employing eye-tracking techniques as an overt index of visual attention (Kowler, Anderson, Dosher & Blaser, 1995) during a facial affect recognition task, as in this current research, will help to elucidate the role of visual attention in driving recognition deficits seen in violent offenders, and thus provide valuable insights into how the efficacy training such approaches could be maximised (Hubble et al., 2015).

Link between eye-scan paths, psychopathology and facial affect recognition

Findings of aberrant visual scanning behaviour in populations demonstrating impaired facial affect recognition further underscore the importance of attention to facial features in emotion categorisation. Of relevance to the present research, abnormal eye-scan paths have been observed in relation to some of the key pathologies associated with IPV and non-IPV

violence. In particular, underutilisation of the eye region has been found in relation to psychopathic traits in non-offenders (Dadds et al., 2008; Gillespie, Rotshtein, Wells et al., 2015). Additionally, attention to the eyes positively correlates with fear recognition in children with callous-unemotional traits (Dadds et al., 2008) and instructing such samples to attend to the eye region of facial stimuli improves fear recognition abilities to that of controls (Dadds et al., 2006).

Although less researched in comparison to psychopathy, studies have also found reduced attention to facial features in depressed samples (Loughland, Williams, & Gordon, 2002; Noiret et al., 2015) and avoidance of the eyes in social anxiety (e.g., Horley et al., 2004; Moukheiber et al., 2010; Staugaard & Rosenberg, 2011). However, some studies have also observed increased attention to the eyes in relation to anxiety (e.g., Perlman et al., 2009). This inconsistency parallels that observed in the recognition literature, specifically, that some studies have found enhanced fear recognition accuracy among highly anxious participants (e.g., Surcinelli et al., 2006), while others have failed to find such impairment (e.g., Cooper et al., 2008). These visual scanning patterns are not necessarily mutually exclusive. It is possible, for example, that anxious participants could avoid the eyes of threatening expressions (as indexed by first fixation time/fixation count) but have difficultly disengaging from the eyes once fixated (as indexed by dwell time) (e.g., Staugaard & Rosenberg, 2011). This proposal demonstrates the importance of studying more than one parameter of visual attention facial affect processing.

Together, empirical findings suggest that directing attention to emotionally-salient parts of an expression is important for accurately decoding emotion, and that a breakdown in the orienting of attention could contribute to the impairment seen in relation to

psychopathology. The findings also suggest that personality variables and their relationship to eye-scan paths may be relevant to understanding facial affect recognition deficits seen in samples of violent offenders. These various findings provide a foundation upon which to investigate whether one mechanism driving recognition impairments in IPV and non-IPV violent men is abnormal eye-scan paths when viewing emotional expressions, and whether these are influenced by levels of personality characteristics that differ among groups.

Present research aims

The present study examines facial affect recognition accuracy for the six basic emotional expressions among offenders who had been convicted of an IPV-related offence and non-IPV violent offenders compared to non-offending controls. A battery of assessments was administered to investigate personality traits and psychopathology that have been implicated in IPV and/or known to relate to eye-scan paths, including psychopathic traits, borderline traits, depression and anxiety. Based on research indicating the need to study the separable dimensions of psychopathy (e.g., Gillespie, Mitchell et al., 2015; Gillespie, Rotshtein, Wells et al., 2015; Hicks & Patrick, 2006; Lockwood et al., 2013), the antisocial, egocentric and callous aspects of psychopathy were examined. Similarly, the state, trait and social aspects of anxiety were all measured. The study aimed to assess the influence of these personality variables on accuracy of expression recognition and on eye-scan paths when viewing emotional faces, as well as how these outcomes differed between groups. Due to the theorised role of fear recognition in inhibiting harmful behaviour (Blair, 2001) and on the basis of previous research demonstrating fear-specific processing abnormalities in relation to psychopathology (e.g., Blair et al., 2004; Dolan & Fullam, 2006; Dawel et al., 2012;

Gillespie, Mitchell et al., 2015; Montagne et al., 2005; Surcinelli et al., 2006), the relationships were assessed across emotional categories, as well as specifically for fear.

Facial affect recognition was assessed using an existing stimulus set of morphed human facial expressions (see Gillespie, Rotshtein, Wells et al., 2015). In that stimulus set, the intensity of the facial expression was manipulated to reflect the ambivalent nature of facial expressions in an *in vivo* social interaction (Adolphs & Tranel, 2004) and to allow for more subtle differences in affect processing to be detected (Calder, Young, Perrett, Etcoff & Rowland, 1996). The expressions were depicted by male and female models based on findings that the processing of emotional stimuli differs according to the sex of the sender (Gillespie, Rotshtein, Satherley et al., 2015; Kret & de Gelder, 2013; Kret, Pichon, Grèzes & de Gelder, 2011).

Attention directed to the eyes and the mouth of facial stimuli was recorded due to these areas transmitting the most diagnostic information for emotion discrimination (Eisenbarth & Aphers, 2011). Measures of attention consisted of mean number of fixations and mean dwell time to these regions. Recognition accuracy was operationalized as the mean number of correctly categorized expressions for each expression.

Hypotheses

On the basis of research examining IPV abusers in custody and in prison (Johnson et al., 2006; Herrero et al., 2016), it was presumed that the vast majority of IPV men would exhibit a generally violent and antisocial profile and thus that there would be considerable overlap between the two groups of violent offenders. There was no rationale for predicting that behavioural outcomes would manifest differently in IPV and non-IPV violent offenders.

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As such, hypotheses were borne out of a "violence perspective" (Felson, 2006). In particular, the recognition impairments and associated eye-scan paths of IPV offenders were expected to be equivalent to those found for non-IPV offenders. The only hypothesised difference lay at the level of personality variables. Specifically, IPV offenders were expected to demonstrate elevated borderline and dysphoric traits relative to their non-IPV violent counterparts. However, it was not clear that this would be statistically different and, as such, was not predicted to produce corresponding group differences in facial affect processing. It was predicted that both groups of offenders would demonstrate higher levels of psychopathology relative to non-offending controls.

From previous findings (e.g., Gillespie, Rotshtein, Satherley et al., 2015; Hoaken et al., 2007; Robison et al., 2012), it was hypothesised that both groups of offenders would show deficits in facial affect recognition relative to non-offenders, particularly in the recognition of negative affect. Moreover, in accordance with research highlighting the role of attention to the eyes in decoding negative affect (Schyns et al., 2007; 2009; Smith et al., 2005; van Rijsbergen & Schyns, 2009), it was predicted that the participant groups would differ in their eye-scan patterns when viewing emotional faces, with offenders attending less to the eyes than controls. Further, based on research demonstrating the influence of personality variables on eye-scan paths, it was hypothesised that group differences in emotion recognition accuracy and eye-scan paths would reflect different psychopathological profiles of the groups. Specifically, in line with findings from non-forensic samples (e.g., Dadds et al., 2008; Gillespie, Rotshtein, Wells et al., 2015; Loughland, Williams & Gordon, 2002; Noiret et al., 2015), it was predicted that elevated levels of social anxiety, depression and

callous psychopathic traits would be related to decreased attention to the eyes and reduced recognition accuracy.

Method

Ethical approval

Ethical approval for this study was obtained from the Committee for Ethical Review of the University of Birmingham[1] and the National Offender Management Service for England and Wales[2]. Principles for ethical conduct in research, outlined by the British Psychological Society, were adhered to throughout this work. All offenders were informed that their acceptance or refusal to participate in the study would have no bearing upon their sentencing, treatment, or parole decisions. Participants were informed of their right to withdraw their data within two weeks of participation. They were provided with an information sheet; signed an informed consent form; and were debriefed following participation.

Participants

One hundred adult males participated in this study, consisting of 73 incarcerated males with a history of violence, and 27 community controls[3]. Offenders were recruited from the Therapeutic Community at HMP ███████ and an enhanced wing at HMP ███ (i.e.,

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[1] ERN_15-0020

[2] NRC 2015-02

[3] The number of participants was informed using a priori power analysis carried out using G Power. Assuming a medium effect size, with 80% power and an alpha of 0.05 using MANOVA, a total sample of 66 was required (22 per group).

where good behaviour had earned privileges). Both prisons are Category B prisons located in the UK.

Violent offenders were identified according to Harris et al.'s (2002) definition of violent crime. Specifically, individuals incarcerated due to "any criminal charge for a violent offence against persons – e.g., assault, assault causing bodily harm, wounding, attempted homicide, homicide, kidnapping, forcible confinement, armed robbery, and all 'hands-on' sexual offences" (p. 383). On the basis of information gathered from case management files and self-report, violent offenders were assigned either to the IPV or non-IPV violent group. Specifically, anyone whose victim of violence, either current or historical, was an intimate partner was classified as IPV ($n = 30$). Offenders who self-reported violence towards an intimate partner but had not received a conviction for IPV were excluded from analyses ($n = 15$). Thus, the non-IPV group consisted of violent offenders who did not have a demonstrable history of IPV, either self-reported or convicted ($n = 28$).

On average, the members of the IPV group had eight previous convictions, while the members of the non-IPV group had seven. IPV convictions included murder, attempted murder, rape and grievous bodily harm. A breakdown of previous convictions as a function of violence status is shown in Table 3.

Table 3. Number (percentage) of offenders with previous violent/non-violent convictions as a function of group.

	IPV offenders (*n* = 30)	Non-IPV offenders (*n* = 28)
No previous convictions	7 *(23.3%)*	6 *(21.4%)*
Violent only	6 *(20%)*	2 *(7.1%)*
Non-violent only	5 *(16.7%)*	8 *(28.6%)*
Violent and non-violent	12 *(40%)*	12 *(42.9%)*

Fifty-two percent of the IPV group had completed some form of treatment. Treatment history included Thinking Skills Programme (TSP; *n* = 6), Enhanced Thinking Skills (ETS; *n* = 5), Controlling Anger and Learning to Manage it (CALM; *n* = 6), Building Better Relationships (*n* = 4), Sex Offender Treatment Program (SOTP; *n* = 3), Building Skills for Recovery (*n* = 2), Prison- Addressing Substance Related Offending (PASRO) (*n* = 2), Healthy Sexual Functioning (*n* = 1), Healthy Relationships Programme (*n* = 1) and Victim Awareness (*n* = 1). Eighty-six percent of non-IPV offenders had completed some form of treatment, including; ETS (*n* = 19), SOTP (*n* = 9), CALM (*n* = 8), Victim Awareness (*n* = 4), TSP (*n* = 2) and PASRO (*n* = 2).

Psychiatric diagnoses of the IPV group included PTSD (*n* = 2), and one of these participants had also been formally diagnosed with depression. Psychiatric diagnoses of non-IPV offenders included PTSD (*n* = 1), depression (*n* = 2) and dissociative disorder (*n* = 1).

The control group participants were recruited from the community of Birmingham UK through advertisements placed online and through word of mouth. The only inclusion criteria were that participants were aged 25-65 and did not have a history of imprisonment. Control participants received £10 per hour of participation.

The majority of participants were white Caucasian (86%); 8% were Black, 4% were Asian and one described himself as 'mixed other'. All participants had normal or corrected-to-normal vision.

Recruitment of offenders

An email was circulated to offender supervisors at HMP ▇▇ asking for the names of offenders on their caseload whose victim of their offence was an intimate partner (current or historical). Non-IPV violent offenders were identified through the prison's electronic database on the basis of their not having been convicted of an IPV-related offence. An information sheet outlining the purpose of the study was circulated to the prospective participants (see Appendix V). Offenders indicated their interest on the sheet and returned this to the Interventions Team through the prison mailing system. Interested participants were contacted through a member of the psychology department to arrange a time for testing. At this time, participants were provided with an information sheet detailing the purpose of the study and what participation would involve (see Appendix VI). Participants from HMP ▇▇▇▇ were recruited with the help of research representatives from the Therapeutic Community. The research was advertised on each wing through posters and question and answer sessions were facilitated with interested parties.

Materials

   Facial Expression Stimuli. An existing set of morphed facial expression stimuli were used for the current task (see Gillespie, Rotshtein, Wells et al., 2015). The stimuli consisted of ten Caucasian models (five males) chosen from the NimStim Face Stimulus Set[4] (Tottenham et al., 2009). A neutral expression and six emotions (anger, disgust, fear, happy, sad, and surprise) were depicted by each model. Models were chosen based on validity data showing a high mean proportion correct for the expressions (0.84 − 0.85, SD =.13). Each expression was morphed from neutral to 100% expressive in 10 frames using the STOIK Morph Man software[5]; producing 10 morphed continua across the six expressions for every model. For the purpose of the current research, two of these frames, moderate intensity (55% expressive) and high intensity (90% expressive), were chosen for every expression conveyed by the models, together with the neutral expression. This produced a total of 130 faces (2 (intensity) x 6 (emotion) x 10 (model) + 10 neutral). The stimuli were displayed on a 19" LG colour monitor. Stimulus timing and presentation were controlled using SR-Research Experiment Builder software (see Figure 2 for example of stimuli).

   Eye-tracking. Participants' eye movements were measured using an EyeLink 1000 eye-tracking system (SR Research Ltd.)[6] which recorded movements of the right eye and examined eye-gaze location and dwell time. Measurements were taken once every millisecond (ms).

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[4] http://www.macbrain.org/resources.htm

[5] http://www.stoik.com/products/video/STOIK-MorphMan/

[6] Funded by an ESRC grant ES/L00237/1

55%   90%
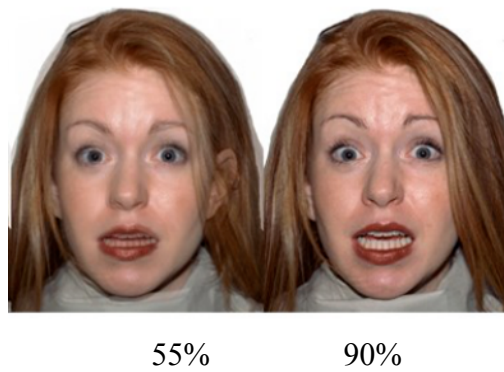
Figure 2. Example of experimental stimuli. A female fearful expression expressed at moderate (55%) and high (90%) intensity. Reproduced from Gillespie, Rotshtein, Satherley et al. (2015)

Measures of psychopathology and personality characteristics

Levenson Self-Report Psychopathy Scales (LSRP; Levenson, Kiehl & Fitzpatrick, 1995). The LSRP is a 26-item measure originally designed to measure self-reported psychopathic traits along two dimensions paralleling the two-factor model of psychopathy (Hare 1991; Hare, 2003). However, research exploring the factor structure in offending and non-offending males found a three-factor model to be optimal (Brinkley, Diamond, Magaletta & Heigel, 2008; Sellbom, 2011). Thus, the three-factor solution was adopted in the current research; with subscales representing the callous (four items), egocentric (ten items) and antisocial (five items) aspects of psychopathy. Respondents are required to indicate the extent to which they agree with each item on a four-point Likert scale ranging from 1 = '*Disagree strongly*' to 4 = '*Agree strongly*'. The three-factor scale has been found to have adequate internal consistency and reliability in a sample of offenders and non-offenders (Cronbach's alpha coefficients of .61, .83 and .62 for the callous, egocentric and antisocial subscales respectively). As Cronbach's alpha penalises shorter scales, inter-item

correlations were also examined and found to be within the recommended range (Sellbom, 2011).

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1970). The STAI comprises 40 items: 20 items for assessing trait anxiety (STAI-T) and 20 for state anxiety (STAI-S). Trait anxiety captures anxiety as a personality trait, while state anxiety captures more transient feelings of anxiety. Respondent are asked to rate the extent to which each item applies to them on a four-point Likert scale, ranging from 1 = *'Not at all'* to 4 = *'Very much so'* for state items, and 1= *'Almost never'* to 4 = *'Almost always'* for trait items. Internal consistency coefficients for the STAI have ranged from .86 to .95 (Spielberger, Gorsuch, Lushene & Vagg, 1983).

Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987). The LSAS is a 24-item scale that assesses the degree of social anxiety and avoidance in situations. It has 13 items that relate to performance anxiety and 11 that relate to social situations. For each item, anxiety and avoidance are rated on a four-point Likert scale, ranging from 0 = *'No fear'* to *3 = 'Severe fear'* and 0 = *'Never avoid'* to 3 = *'Usually avoid'.* Baker, Heinrichs, Kim and Hofmann (2002) report Cronbach's alphas for the LSAS as .91 for fear, and .92 for avoidance.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961). The BDI is a 21-item self-report inventory that measures affective and physical symptoms that are associated with depression. Items consist of a graded series of four options ranging from 0 to 3 in terms of symptom severity. Respondents are asked to indicate which response best describes them. Higher scores indicate higher levels of depression. Internal

consistency for the BDI has been found to range between .73 to .92 (Beck, Steer & Garbin, 1988).

Personality Assessment Inventory – Borderline Features Scale – (PAI-BOR; Morey, 1991). The PAI-BOR was administered to offenders to measure the presence of self-reported borderline personality features. The PAI-BOR comprises 24 items tapping four major features of personality pathology associated with BPD: affective instability, identity problems, negative relationships and self-harm. Respondents were asked to indicate the extent to which the statement applied to them on a five-point Likert scale, from 0 = '*False*' to 4 = '*Very true*'. The average internal consistency for the PAI-BOR across normative, college and clinical groups is .88 (Morey, 1991).

Conflict Tactics Scale-Revised (CTS2; Straus et al., 1996). The CTS2 was used as a screening tool to assess offenders' self-reported physical and/or sexual violence towards a partner in order to ensure correct group classification. Respondents were required to indicate whether they had ever perpetrated the acts described against a partner, stranger or acquaintance in a dichotomous fashion[7]. Those who reported having perpetrated any of the behaviours against a partner but did not have a conviction for IPV were excluded from analysis. The instrument's psychometric properties are discussed in detail in chapter four.

The Marlowe-Crowne Short Form C Social Desirability Scale (MC; Reynolds, 1982). The MC was used to measure socially desirable response tendencies. Respondents rate whether 13 items are '*True*' or '*False*' for them. Research has reported internal consistency

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[7] The following context was provided for the acts "There are times when we disagree, get annoyed, have fights, or just harm other people for some reason. Most people are not convicted for all the violent acts they ever carry out. We would like you to read the below lists of violent acts and tell us if you have ever used any of them. You can freely tick these boxes without any judgement being passed on you or this information being passed to the authorities, the information is purposefully too vague to identify crimes with".

scores ranging from .72 to .96 for this measure in forensic samples (Andrews & Meyer, 2003).

Twelve control participants did not complete the STAI-S, LSAS, BDI or MC.

Procedure

Participants sat at a desk, approximately 68cm away from the display monitor. To limit head movement, they were supported by a chin rest with an adjustable height. It was explained that they would be asked to categorise a series of emotional expressions while their eye movements were recorded. A calibration procedure was performed prior to each trial block in order to ensure accuracy of eye-gaze measurement. This was done using a standardised procedure with nine fixation points. Following calibration, a validation check was carried out on the accuracy of the recording equipment. If the accuracy could not be validated then the calibration procedure was repeated. A fixation cross was then presented followed by the target expression for 2000ms (considered to be the time taken for an individual to judge facial affect in an *in vivo* social interaction, Hoaken et al., 2007). After 2000ms the target stimulus was removed and the participant was asked to categorise the expression as one of the six basic emotions or neutral. Response options remained listed on screen, alongside a corresponding number for response indication (e.g., 1 ANGER), until a response was made using the keyboard. Prior to each trial, the experimenter ensured that the participant's eye-gaze rested on the fixation point. Stimuli were randomised over four blocks of 35 trials. Each participant received feedback at the end of each block (i.e., proportion correct) and given the opportunity for a rest to minimise the possibility of fatigue. After the emotion recognition task, participants completed a computerised saccade task as part of a

wider research study examining visual processing in violent offenders[8]. Participants then completed questionnaire measures. The average completion time was approximately 90 minutes.

Treatment of data

Recognition accuracy was assessed for each expression as the average number of correct classifications. Eye movements were analysed using pre-determined regions of interest (ROI), which were the eyes and mouth. Fixation count (i.e., the number of fixations) and absolute dwell time (i.e., total fixation duration) are reported for these areas of interest. This information was considered to reflect participants' interest in these areas of the face, and to indicate how important they found this information for emotion categorisation (Gillespie, Rotshtein, Wells et al., 2015).

A series of analyses was carried out to examine differences in accuracy of emotion recognition and eye-scan paths between men recruited from HMP ███ and HMP ██████, and between sex offenders and non-sex offenders, to ensure that the composition of IPV and non-IPV groups did not confound the results.

A mixed-model ANOVA was performed for the emotion recognition task with the following within-subjects variables: 6 (expression: anger, disgust, fear, happy, sad, surprise) x 2 (intensity of expression: moderate, high) x 2 (sex: male, female) x 2 (ROI: eyes, mouth), with group (IPV, non-IPV violent, control) as a between-subjects variable. These analyses

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[8] For this task, participants were required to look towards or away from a target stimulus presented to either the left or the right hand side of a fixation point. Target stimuli were made up of angry, fearful, and neutral facial expressions, as well as negative (e.g. snake, grenade) and neutral (e.g. lamp, table) non-face stimuli.

were performed for dwell time and fixation count. A similar analysis was performed for accuracy of expression recognition (minus the ROI factor). Greenhouse-Geisser correction was used when Mauchly's test indicated that the assumption of sphericity had been violated. Significant interactions were broken down using ANOVAs and thus all further analyses were guided by the results of the original mixed ANOVA. As advised for three independent groups (Keselman, 1998), significant F tests on group were explored using Fisher's LSD *post hoc* tests.

Correlational analyses were used to examine the relationship of questionnaire responses with eye-tracking parameters for each ROI. Where age was significantly correlated with dwell time/fixation count on the eyes or the mouth, partial-correlations were computed.

Statistical analyses were carried out using IBM SPSS Statistics 22 for Microsoft Windows, with the level of significance set at $p = .05$. Effect sizes for ANOVA are reported as partial-eta squared (ηp^2) and interpreted based on Cohen's (1988) suggestion of small = 0.01, medium = 0.06 and large = 0.14.

Initial data screening

There were no significant differences in age ($F(2, 82) = .151$, $p = .860$) between IPV offenders ($M = 40.10$, $SD = 10.84$), non-IPV offenders ($M = 38.29$, $SD = 14.11$), and non-offenders ($M = 38.26$, SD = 18.40).

Offending history of IPV group

A series of one-way ANOVAs indicated that there were no differences between IPV offenders with and without a criminal history (violent or non-violent) across experimental outcomes (all *ps* > .163).

Prison differences

A repeated measures ANOVA showed that accuracy of emotion recognition did not differ between offenders recruited from HMP ▮▮▮▮▮ and HMP ▮▮ for any emotion ($F(5, 285) = .542$, $p = .744$, $\eta p^2 = .009$). A series of one-way ANOVAs comparing the two groups on fixation count and dwell time to the eyes and mouth of stimuli showed that there were no significant differences between offenders recruited from HMP ▮▮ and HMP ▮▮▮ across either eye-tracking parameter (all ps $>.09$). In terms of questionnaire measures, participants recruited from HMP ▮▮ scored significantly higher on LSRP Ego ($t(57) = 2.314$, $p = .024$) and social desirability (Marlow-Crowne, $t(56) = 2.145$, $p = .036$) than did participants recruited from HMP ▮▮▮▮

Sex offending history

Given that the number of sex offenders in the IPV ($n = 6$) and non-IPV ($n = 18$) group differed, a repeated measures ANOVA was used to check for differences in emotion recognition between sex offenders and non-sex offenders. As there was a significant difference in age between the two groups ($t(57) = 2.26$, $p = .027$), age was included as a covariate. The analysis showed that sex offenders and non-sex offenders did not differ in accuracy of emotion recognition ($F(3.48, 194.57) = 2.319$, $p = .067$, $\eta p^2 = .040$). Likewise, a series of univariate ANCOVAs showed that there were no differences between the sex offenders and non-sex offenders in attention to the eyes and mouth across eye-tracking parameters (all ps $>.181$). There were significant differences in STAI-S ($t(57) = 2.293$, $p = .026$), SAS Anxiety ($t(53) = 2.161$, $p = .035$), SAS avoidance ($t(53) = 2.287$, $p = .026$) and BDI ($t(56) = 2.340$, $p = .023$) scores between sex offenders and non-sex offenders, with offenders without a history of sex offending scoring higher on all measures.

Results

Psychopathology and personality characteristics

A series of ANOVAs, controlling for history of sex offending and place of residency accordingly, were conducted to examine group differences in psychopathology. Analyses revealed that groups differed in levels of state anxiety, social anxiety and depression, (see Table 4). Both the IPV and non-IPV group scored higher than controls on STAI-S and BDI, and IPV offenders scored higher than controls on SAS anxiety and SAS avoidance. There was a trend toward IPV offenders scoring higher than non-IPV offenders on the BDI, although this did not reach statistical significance ($p = .055$). The groups did not differ in their reporting of psychopathic traits.

Table 4. Sample means and (standard deviations) for questionnaire measures

	Non-offenders (*n* = 27)	IPV (*n* = 30)	Non-IPV (*n* = 28)	Statistic *F, p*
LSRP Callous	6.70 (2.48)[a]	7.14 (3.10)[a]	6.32 (2.92)[a]	1.008, .370
LSRP Egocentric[+]	17.98 (1.14)[a]	15.63 (1.23)[a]	15.81 (1.10)[a]	1.324, .272
LSRP Antisocial	10.40 (3.18)[a]	11.73 (3.74)[a]	11.32 (3.21)[a]	1.077, .345
STAI- State[++]	21.07 (4.02)[a]	36.70 (1.85)[b]	32.90 (2.26)[b]	6.460, .003
STAI- Trait	39.48 (9.65)[a]	46.17 (10.82)[b]	40.43 (13.21)[ab]	2.958, .057
SAS anxiety[++]	11.35 (5.84)[a]	28.58 (2.74)[b]	26.25 (3.42)[ab]	3.325, .042
SAS avoidance[++]	8.44 (5.35)[a]	25.61 (2.51)[b]	20.90 (3.13)[ab]	4.532, .014
BDI[++]	6.87 (4.55)[a]	17.20 (9.63)[b]	11.52 (7.66)[b]	9.937, .001
PAI BOR		32.62 (13.30)[a]	25.86 (13.07)[a]	3.748, .058
MC[+]	4.09 (1.40)[a]	7.04 (.51)[a]	7.87 (.79)[a]	1.891, .053

Note: LSRP = Levenson Self Report Psychopathy scale; STAI = State-Trait Anxiety Inventory; SAS = Social Anxiety Scale; BDI = Becks Depression Inventory; PAI = Personality Assessment Inventory. MC = Marlowe-Crowne Social Desirability Scale. Superscript letters denote results of LSD post-hoc tests. Values that share a letter are the statistically similar at *p* < .05, values that do not share a letter are statistically different. [+] denotes ANCOVA controlling for residency, [++] denotes ANCOVA controlling for sex offending history. Adjusted means and standard errors are reported for ANCOVAs.

Effect of group (IPV, non-IPV and control) on accuracy

Table 5 reports accuracy of emotion expression recognition by intensity and sex for the three groups. An ANOVA on accuracy data revealed no significant interactions with group (all ps >.249).

Table 5. Accuracy rate of emotion recognition for each expression as a function of group (non-offenders, IPV offenders or non-IPV offenders), sex (female or male), and intensity levels (55% expressive = moderate, 90% expressive = high)

		Non-offenders	IPV offenders	Non-IPV offenders
		Proportion correct M (SD)		
Female 55%	Angry	0.79 (0.22)	0.90 (0.13)	0.84 (0.19)
	Disgust	0.89 (0.25)	0.90 (0.17)	0.89 (0.18)
	Fear	0.67 (0.25)	0.63 (0.22)	0.60 (0.33)
	Happy	0.89 (0.11)	0.82 (0.23)	0.85 (0.21)
	Sad	0.71 (0.17)	0.75 (0.24)	0.76 (0.20)
	Surprise	0.86 (0.17)	0.83 (0.18)	0.81 (0.23)
Male 55%	Angry	0.75 (0.20)	0.83 (0.15)	0.84 (0.16)
	Disgust	0.70 (0.22)	0.61 (0.22)	0.67 (0.18)
	Fear	0.54 (0.28)	0.53 (0.26)	0.53 (0.30)
	Happy	0.86 (0.17)	0.77 (0.27)	0.84 (0.17)
	Sad	0.77 (0.15)	0.75 (0.19)	0.75 (0.26)
	Surprise	0.82 (0.22)	0.85 (0.13)	0.82 (0.22)

Female 90%	Angry	0.89 (0.18)	0.93 (0.13)	0.87 (0.19)
	Disgust	0.89 (0.21)	0.88 (0.18)	0.91 (0.15)
	Fear	0.55 (0.31)	0.53 (0.22)	0.55 (0.30)
	Happy	0.99 (0.05)	0.97 (0.15)	0.99 (0.04)
	Sad	0.83 (0.16)	0.87 (0.17)	0.92 (0.14)
	Surprise	0.84 (0.19)	0.88 (0.19)	0.88 (0.14)
Male 90%	Angry	0.82 (0.15)	0.82 (0.18)	0.89 (0.13)
	Disgust	0.87 (0.18)	0.82 (0.15)	0.83 (0.21)
	Fear	0.52 (0.27)	0.55 (0.23)	0.52 (0.32)
	Happy	0.98 (0.06)	0.97 (0.12)	0.97 (0.07)
	Sad	0.87 (0.14)	0.88 (0.17)	0.88 (0.18)
	Surprise	0.80 (0.22)	0.87 (0.15)	0.86 (0.14)

Effect of group (IPV, non-IPV and control) on eye-scan paths

Fixation count. Figure 3 shows fixation count to the eyes and mouth as a function of emotion, intensity and sex of expression. An ANOVA on fixation count on the eyes and the mouth revealed a significant interaction of ROI with group and intensity ($F(2, 81) = 3.854$, $p = .025$, $\eta p^2 = .087$). To better understand this interaction, fixation count on the eyes and mouth was analysed separately. Analyses revealed a significant interaction between group and intensity for the mouth ($F(2, 81) = 4.289$, $p = .017$, $\eta p^2 = .096$) but not the eyes ($F(2, 81) = 1.370$, $p = .260$, $\eta p^2 = .033$)

A one-way (between-subjects) ANOVA computed on the difference between fixation count on the mouths of moderate intensity emotional expressions relative to high intensity

emotional expressions (moderate – high) revealed that both groups of offenders fixated more on the mouths of moderate intensity expressions compared to high intensity expressions than did controls ($p = .046$ for IPV and $p = .010$ for non-IPV offenders). There was no significant difference in fixation count on the mouths of moderate intensity expressions compared to high intensity expressions between groups of offenders ($p = .516$). This suggests that when the decoding of facial affect is more difficult, offenders focus more on mouths than do controls. Figure 4 shows the number of fixations to the mouths of moderate relative to high intensity expressions as a function of group.

The initial ANOVA also revealed a significant interaction of ROI with sex and group ($F(2, 81) = 5.494$, $p = .006$, $\eta p^2 = .119$). Again, follow up ANOVAs were computed separately for the eyes and mouth to better understand this interaction. A significant interaction between group and sex was found for both the eyes ($F(2, 81) = 4.071$, $p = .021$, $\eta p^2 = .091$) and the mouth ($F(2, 81) = 3.141$, $p = .049$, $\eta p^2 = .072$). A one-way ANOVA ($F(2, 81) = 4.071$, $p = .021$) comparing total fixation count on female eyes relative to male eyes (female – male) showed that non-offenders looked comparatively more at female eyes than male eyes compared to IPV offenders ($p = .029$) and non-IPV offenders ($p = .009$) but the two groups of offenders did not differ from each other ($p = .609$).

A similar ANOVA ($F(2, 81) = 3.141$, $p = .049$) computed for number of fixations on the mouths of female relative to male faces (female – male) showed that non-IPV offenders looked more at the mouths of female expressions than did non-offenders ($p = .020$). There was also a trend for IPV offenders to look more at female mouths in comparison to non-offenders, although this difference was not statistically significant ($p = .056$). The difference in number of fixations on female mouths relative to male mouth for IPV versus non-IPV

offenders was non-significant ($p = .636$). Figure 5 shows the number of fixations to the eyes and mouths of female relative to male expressions for each group.

Taken together, results showed that both groups of offenders compared with controls attended less to the eyes of female relative to male faces. Conversely, for fixation count on the mouth, non-IPV offenders compared with controls fixated on the mouth of female expressions more often than male expressions. Although the accuracy of judging male and female faces did not differ between groups, this finding suggests that the groups are using different information to make their judgement.

Dwell time. Figure 6 shows attention to the eyes and mouth as a function of emotion, intensity and sex of expression for dwell time. A mixed-model ANOVA on dwell time revealed a significant interaction between ROI, group, and intensity ($F(2, 81) = 3.210$, $p = .046$, $\eta p^2 = .073$), which was qualified by a significant group x intensity interaction for dwell time on the mouth ($F(2, 81) = 3.148$, $p = .048$, $\eta p^2 = .07$). There was no significant group x intensity interaction for dwell time on the eyes ($F(2, 81) = 1.708$, $p = .188$, $\eta p^2 = .040$). A one-way between-subjects ANOVA ($F(2, 81) = 3.148$, $p = .048$) revealed that non-IPV offenders spent more time looking at the mouths of moderate intensity faces, relative to high intensity faces (moderate – high), as compared to non-offenders ($p = .021$). There was also a trend towards the same for IPV offenders compared to non-offenders, although this was not statistically significant ($p = .053$). There was no difference in dwell time on the mouth as a function of intensity between IPV and non-IPV violent offenders ($p = .659$). Figure 7 shows dwell time to the mouths of moderate relative to high intensity expressions as a function of group. For completeness, all other significant interactions that did not include group are reported in Table 6.
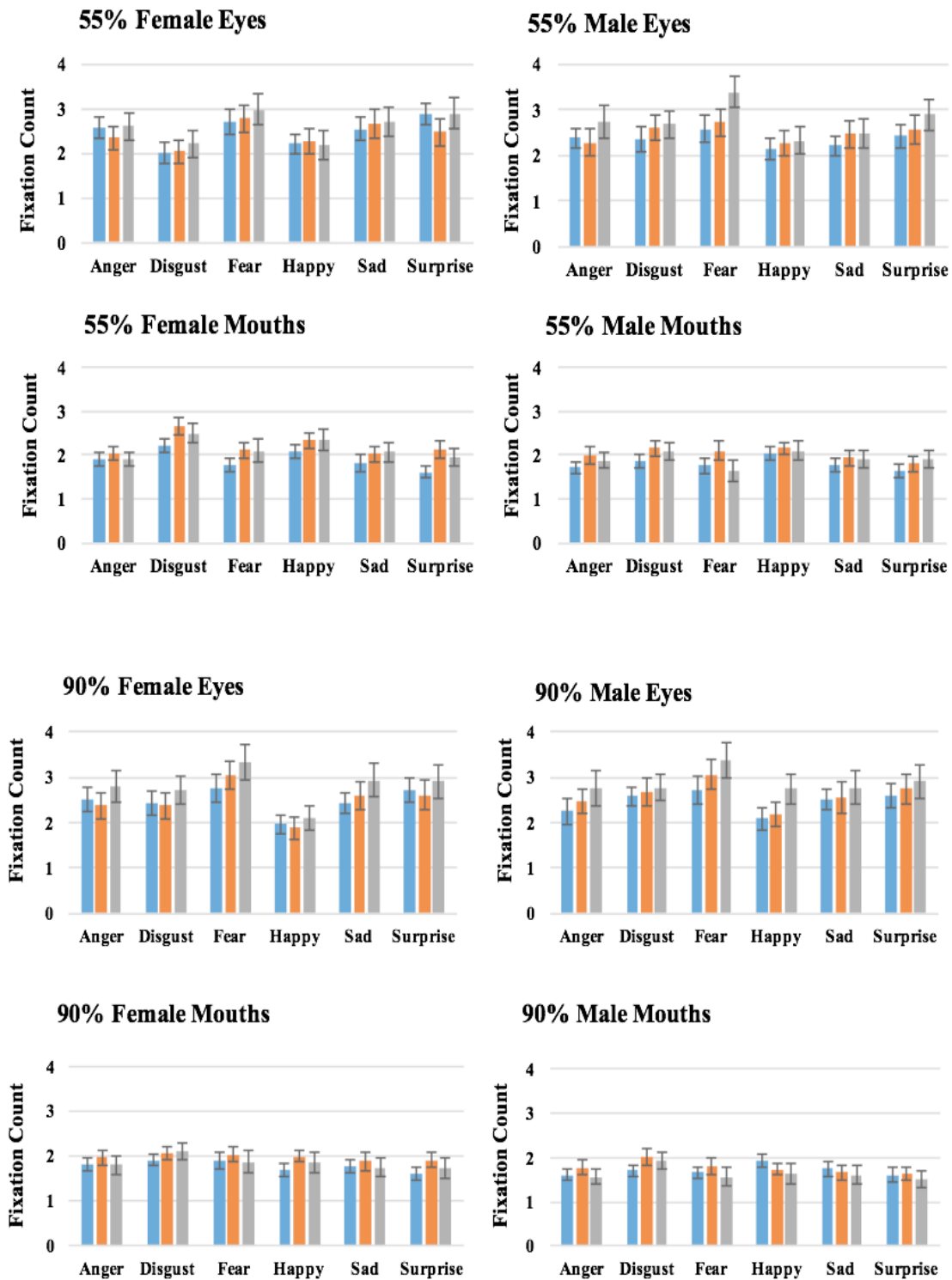
Figure 3. Number of fixations on the eyes and the mouth as a function of group, intensity, and sex of stimuli

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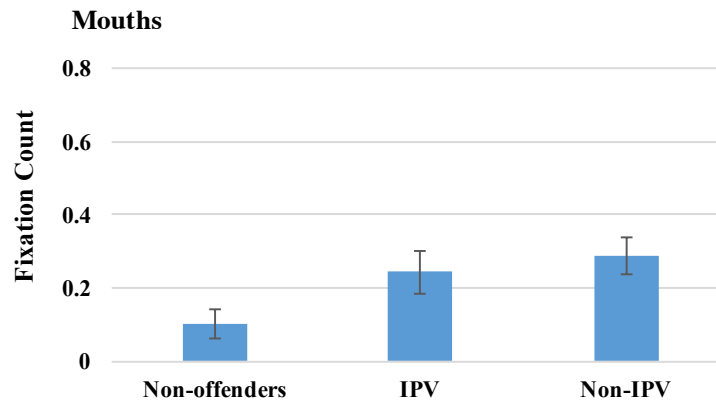
Mouths

Figure 4. Difference in number of fixations to the mouths of moderate relative to high (moderate – high) intensity expressions as a function of group.
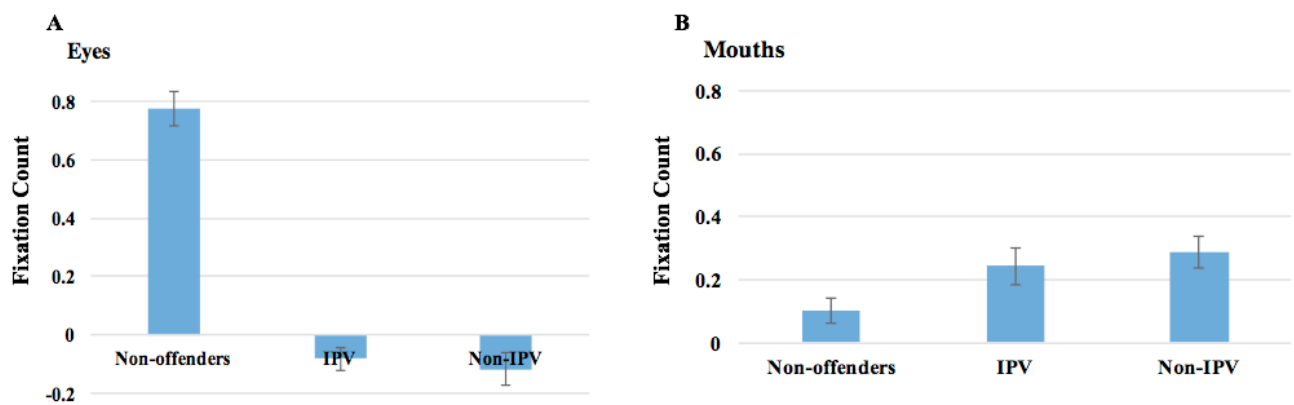
Figure 5. Difference in number of fixations to the eyes **(A)** and mouth **(B)** of female relative to male (female – male) expressions as a function group.
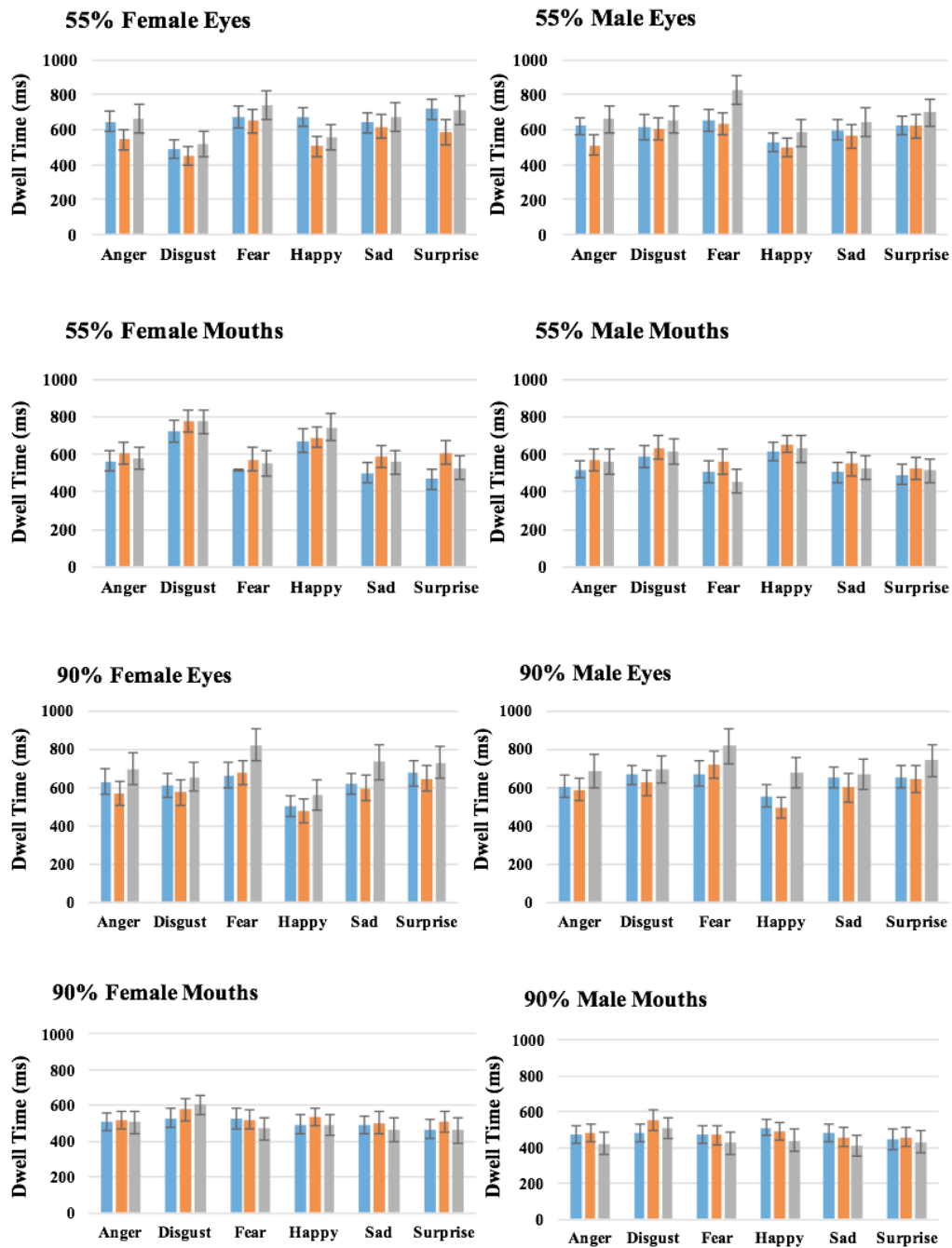
Figure 6. Dwell time (ms) to the eyes and the mouth as a function of group, intensity and sex of stimuli.
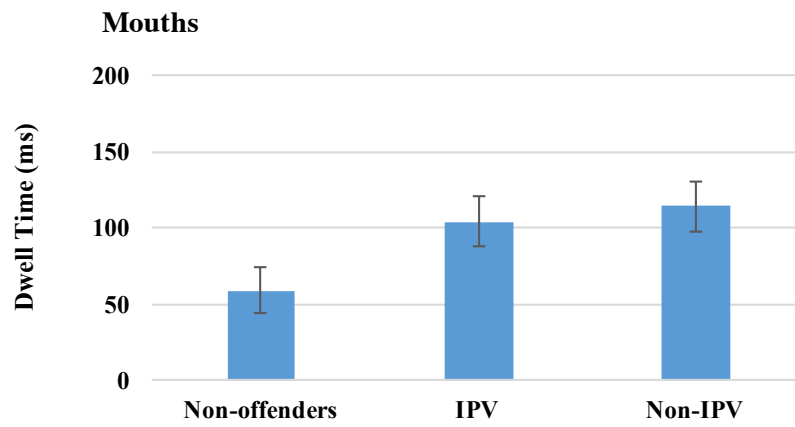
Mouths

Figure 7. Difference in dwell time (ms) to the mouths of moderate relative to high (moderate – high) intensity expressions as a function of group.

Table 6. Summary of the significant main effects and interactions across eye-tracking parameters.

Effect	*F*	df	*p*	ηp^2
FIXATION COUNT				
Group x Intensity x ROI	3.854	2, 81	.025	.087
Group x Sex x ROI	5.494	2, 81	.006	.119
Emotion	22.151	5, 405	.001	.215
Intensity	8.200	1, 81	.005	.092
Sex	17.175	1, 81	.001	.175
ROI	9.612	1, 81	.003	.106
Emotion x Intensity	6.712	5, 405	.001	.077
Emotion x Sex	4.260	5, 405	.001	.050
Emotion x Intensity x Sex	2.372	5, 405	.039	.028
Emotion x ROI	36.705	5, 405	.001	.312
Intensity x ROI	39.533	1, 81	.001	.328
Emotion x Intensity x ROI	2.283	5, 405	.046	.027
Sex x ROI	5.494	1, 81	.001	.233
Emotion x Sex x ROI	8.416	5, 405	.001	.094
Emotion x Intensity x Sex x ROI	3.615	5, 405	.003	.043
DWELL TIME				
Group x Intensity x ROI	3.210	2, 81	.046	.073
Emotion	15.846	5, 405	.001	.164
Intensity	53.584	1, 81	.001	.398
Sex	20.986	1, 81	.001	.206
Emotion x Intensity	10.036	5, 405	.001	.110
Emotion x ROI	40.203	5, 405	.001	.332
Intensity x ROI	64.362	1, 81	.001	.443
Emotion x Intensity x ROI	7.574	5, 405	.001	.086
Sex x ROI	27.197	1, 81	.001	.251
Emotion x Sex x ROI	10.843	5, 405	.001	.118
Emotion x Intensity x Sex x ROI	4.001	5, 405	.001	.047

Correlations between personality characteristics and eye-tracking parameters

Given that there were significant negative correlations of age with fixation count (r = -.209, p =.036) and dwell time (r = -.208, p =.038) on the eyes, partial correlations controlling for age were used to analyse the relationship of questionnaire responses with attention to the eyes. Age did not correlate with accuracy (r = -.178, p = .077), or with dwell time (r = .146, p = .147) or fixation count (r = .153, p = .129) on the mouth and so bivariate correlations were computed. Due to the number of correlations computed, a more conservative p value was adopted for interpreting significant results (.01). Correlations that were significant using a typical alpha level of .05 are highlighted for information only.

Across stimulus set

Table 7. reports correlation coefficients for the questionnaire measures with accuracy and with attention to the eyes and mouth of emotional faces collapsed across expression, intensity and sex.

Accuracy. There were no significant correlations for the questionnaire measures and accuracy of emotion recognition (all ps > .355).

Fixation Count. Fixation count for eyes correlated positively with antisocial traits (r = .261, p = .036), indicating that increasing levels of antisocial traits were associated with more fixations to the eyes of emotional expressions. Fixation count for mouths negatively correlated with SAS Anxiety (r = -.232, p = .034), indicating that increasing levels of social anxiety were associated with fewer fixations on the mouths of emotional expressions.

Dwell Time. There was an inverse relationship between time spent looking at mouths and egocentric psychopathic traits (LSRP Ego, r = -.215, p =.034). This demonstrates that

increasing levels of egocentric traits were associated with reduced time looking at the mouths. There were no significant relationships between measures of psychopathology and dwell time on the eyes of emotional expressions (all ps >.085).

Fear expressions

Correlation coefficients for questionnaire measures with accuracy and attention to the eyes and mouth of fear expressions are shown in Table 8.

Accuracy. State anxiety was negatively correlated with fear recognition, indicating that increasing levels of transient anxiety was associated with poorer fear recognition (r = -.281, p .023).

Fixation Count. Increasing levels of antisocial traits were associated with more fixations to the eyes of fearful expressions (r = .263, p = .034). There were no significant correlations for number of fixation to the mouths of fearful expressions (all ps >.60).

Dwell Time. There were no significant correlations between personality characteristics and time spent looking at the eyes (all ps >.079) and mouth (all ps >.071) of fear expressions.

Notably, none of the aforementioned relationships were significant at p =.01[9].

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[9] Analysing correlations for offenders separately to non-offenders yielded results in the same direction.

Table 7. Correlation coefficients among the questionnaire measures with accuracy and attention to ROI as a function of fixation count and dwell time collapsed across expression, sex and intensity.

	LSRP Ego	LSRP Callous	LSRP Antisocial	STAI State	STAI Trait	SAS Anxiety	SAS Avoidance	BDI	PAI
					Accuracy				
Overall	-.065	-.156	.013	.059	-.034	.041	-.075	-.009	-.041
					Fixation count				
Eyes	.177	.128	.261*	-.039	.015	.131	.129	.105	.001
Mouth	-.153	-.075	-.127	.002	-.079	-.232*	-.152	-.197	-.137
					Dwell time				
Eyes	.186	.085	.215	-.032	.036	.195	.161	.179	-.010
Mouth	-.215*	-.162	-.178	.133	.049	-.115	-.039	-.121	-.126

Note: Partial correlation for eyes (controlling for age). *Two-tailed test significant at <.05

Table 8. Correlation coefficients among the questionnaire measures with accuracy and attention to ROI as a function of fixation count and dwell time for fear expressions.

	LSRP Ego	LSRP Callous	LSRP Antisocial	STAI State	STAI Trait	SAS Anxiety	SAS Avoidance	BDI	PAI
				Accuracy					
Fear	-.083	-.105	-.144	-.281*	-.240	-.086	-.232	-.083	-.169
				Fixation count					
Eyes	.160	.147	.263*	-.066	-.021	.102	.126	.057	.004
Mouth	-.116	-.041	-.094	.009	-.060	-.206	-.118	-.178	-.080
				Dwell time					
Eyes	.179	.095	.219	-.037	.002	.190	.184	.120	-.017
Mouth	-.183	-.149	-.148	.121	.057	-.114	-.027	-.111	-.103

Note: Partial correlation for eyes (controlling for age). *Two-tailed test significant at <.05

Discussion

The present study drew from prior research, which has shown the importance of visual scanning behaviour for emotional decoding, with research showing an association between personality characteristics and eye-scan paths in attempts to provide a more comprehensive understanding of facial affect processing in IPV. In particular, this study offers the following contributions to the literature: (1) extending investigations of facial affect recognition to populations of IPV prisoners; (2) exploring whether IPV prisoners differ from non-IPV violent prisoners in their facial affect recognition abilities; (3) examining the role of eye-scan paths in underlying recognition deficits in violent offenders; and (4) exploring how facial affect processing is influenced by psychopathology implicated in violent offending.

How do IPV, non-IPV violent, and non-offenders differ in their recognition accuracy?

Unlike previous research exploring facial affect recognition in community samples of IPV perpetrators (e.g., Babcock et al., 2008; Marshall & Holtzworth-Munroe, 2010), this study did not find evidence for impaired facial affect recognition among IPV offenders relative to non-offending controls. Indeed, scholars have often emphasised that community samples of IPV men may be fundamentally different to prison samples, who have typically perpetrated more severe IPV (e.g., Garcia-Jiménez et al., 2014; Pascual-Leone et al., 2011; Slep et al., 2015). However, it is unclear why recognition deficits would be ameliorated rather than exacerbated in prison samples of IPV perpetrators. The work of Babcock and colleagues would suggest that this does not reflect an over-representation of generally violent abusers in a prison sample, since Babcock et al. (2008) found that generally violent abusers demonstrated the most impoverished recognition relative to other types of abusers.

It is noteworthy that stimuli in the current study were presented for 2000ms, a shorter time than that of previous research, where stimuli were presented for up to four seconds

(Marshall and Holtzworth-Munroe, 2010) and ten seconds (Babcock et al., 2008). Given that facial affect recognition can be achieved under viewing times as short as 100ms (Prkachin, 2003) and that emotion categorisation in free-viewing conditions occurs after around two seconds (Cooper et al., 2008), the findings of previous studies may be confounded by the measurement of additional cognitive processes, such as attentional biases (Cooper, et al., 2008). Furthermore, shorter presentation times provide a more ecologically valid test of facial affect recognition, similar to that occurring in an *in vivo* interaction (Cooper et al., 2008; Hoaken et al., 2007), and thus the current study may provide a more accurate representation of facial affect recognition abilities. However, evidence suggests that longer viewing times typically enhance recognition (e.g., Cooper et al., 2008; Fenske et al., 2015; Surcinelli et al., 2006), and thus it seems unlikely that the reduced presentation time in the current research was responsible for diminishing between-group differences.

It is further noteworthy that participants in the study of Babcock et al. (2008) completed the recognition task shortly after an 'anger induction' task. Given that negative affect impedes an individual's ability to process information (Tashiro & Frazier, 2007), Babcock et al.'s (2008) findings of impaired recognition of disgust and neutral facial expressions among IPV men are arguably not a true reflection of their recognition abilities, but instead reflect recognition abilities during times of negative arousal. As a significant proportion of IPV occurs in the context of conflict and heightened emotional arousal (Seigel, 2013), the discrepancy in research findings could have potentially important implications for interventions targeting emotion recognition deficits in IPV. In particular, they could suggest that the efficacy of treatment modules would be enhanced if they targeted recognition during times of heightened emotional arousal (i.e., when facial affect recognition is seemingly most compromised). This proposal is tentative and future research is needed to elucidate the moderating role of emotional arousal on recognition deficits in IPV offenders.

Indeed, Marshall & Holtzworth-Munroe (2010) found deficits in facial affect recognition under typical processing conditions, indicating that emotional arousal cannot adequately account for failure of the current research to observe deficits in IPV men. However, their recruitment strategy was such that the IPV sample was likely biased toward IPV occurring in the context of marital dissatisfaction, which has been found to be negatively associated with a man's ability to decode his partner's emotion (Cohen et al., 2012).

Finally, the fact that the present study did not replicate recognition deficits in non-IPV violent offenders relative to non-offenders is significant for interpreting the current research findings. Previous research has reported such deficits using a range of samples, stimuli and procedures, including in studies employing the same stimulus set as that used in the present research (Gillespie, Rotshtein, Satherley et al., 2015). Although offenders in the current study showed diminished fear recognition accuracy relative to other emotions, this was not different to that seen for non-offenders.

Consistent with a violence perspective of IPV (Felson, 2006), IPV offenders in the present research were not different to other types of violent offenders in their ability to decode emotion from strangers' expressions across expression category, sex or intensity. Such similarity in the recognition of abilities of IPV relative to non-IPV offenders is inconsistent with the recent study of Bueso-Izquierdo et al. (2015) which found that IPV offenders were more accurate at recognising disgust and surprise expressions relative to non-IPV offenders. Unfortunately, a lack of fully translated article renders it difficult to interpret the inconsistent results. However, it may be important to consider that three quarters of the IPV group in the current research had wider criminal histories. It is unclear whether similarity in recognition abilities between IPV and non-IPV violent offenders would be observed in a sample of IPV-only offenders given what is known about abuser heterogeneity (e.g., Herrero et al., 2016; Holtworth-Munroe et al., 2000; Holtzworth-Munroe & Stuart, 1994; Huss, &

Ralston, 2008; Johnson et al., 2006; Waltz, Babcock, Jacobson, & Gottman, 2000; Theobald, Farrington, Coid & Piquero, 2016).

How do eyes-scan paths differ between groups?

Research hypotheses were partially supported in that groups differed in their eye-scan paths when viewing emotional faces. However, these differences were observed as a function of sex and intensity of expression rather than emotion category, and did not correspond to group differences in recognition accuracy.

Eye-scan paths as a function of expression intensity

Compared with non-offenders, IPV and non-IPV offenders fixated more often on the mouths of moderate intensity expressions relative to high intensity expressions. A similar pattern emerged for dwell time. Specifically, compared to non-offending controls, non-IPV offenders spent more time looking at the mouths of moderate intensity faces relative to high intensity faces. There was also a trend in the same direction for IPV offenders. The findings suggest that violent offenders' visual scanning behaviour is more affected by task difficulty than non-offenders'. In particular, non-offenders utilise information from the mouths in a set way regardless of expression intensity whereas violent offenders utilise information from the mouths more when decoding is more difficult.

As the stimuli were presented for a limited time in the current research, increased attention to the mouths of low intensity expressions had to be at the expense of attention to other facial features. As such, increased reliance on information from the mouth under more difficult processing conditions could put violent offenders at risk of missing important emotional information from the eye region, which has been found to play an important role in

decoding fear and anger (Schyns et al., 2007; Schyns et al., 2009; Smith et al., 2005; van Rijsbergen & Schyns, 2009).

Nonetheless, despite group differences in attention to the mouths of expressions according to intensity, there was no corresponding interaction with participant group and intensity for recognition accuracy. It could be argued that this finding underscores the importance of the eyes in determining recognition accuracy (e.g., Emery, 2000; Yoon et al., 2016), since attention to the eyes of expressions was in fact similarly distributed across groups.

Eye-scan paths as a function of sex of expression: Eyes

Groups also differed in their allocation of attention to the eyes and mouth of faces depending on the sex of the expression. Specifically, non-offenders made comparatively more fixations to the eyes of female expressions than to male expressions than did IPV and non-IPV offenders, who showed the converse fixation pattern (i.e., more fixations to the eyes of male relative to female faces). In interpreting this finding, it is important to consider that incarcerated men encounter a disproportionate number of male faces in prison and that familiarity may have confounded the visual scanning behaviour of offenders relative to non-offenders when viewing male and female faces. For example, given volatility in prison, incarcerated males may have learnt the importance of gauging other male's emotional state through fixating on the eyes. Similarly, offenders may find it awkward to make eye contact with females given that they encounter very few females in their day-to-day environment. Indeed, research has shown that processing behaviour differs according to the similarities in race of the sender and decoder, with enhanced performance seen for the decoder's own race, seemingly owing to the role of familiarity (e.g., Gross, 2009; Hayden, Bhatt, Joseph & Tanaka, 2007).

Interestingly, IPV offenders did not process female faces differently to non-IPV violent offenders, suggesting that abnormal processing of female faces is not a mechanism which puts an individual at risk of perpetrating violence toward an intimate partner. However, the implications of this finding are limited by the inclusion of non-IPV violent offenders with female victims, and that the stimuli were unknown to the offenders (while IPV is specifically perpetrated toward a known female). Therefore, a logical extension would be to see if differences between IPV and non-IPV violent offenders emerge when viewing their partner's expressions, and when IPV offenders are compared to a specific samples of non-IPV violent offenders with female victims.

Although a corresponding interaction with participant group and sex was not observed for recognition accuracy in the current study, the neglect of female eyes relative to male eyes seen in violent offenders could put violent offenders at risk of misconstruing female emotional displays under different processing conditions, particularly when recognition is further compromised by the presence of one of a myriad of relational, situational and emotional characteristics, such as heightened emotional arousal, couple conflict, or intoxication (Borrill, Rosen & Summerfield, 1987, Wolf, 2007). Given the importance of attention to the eyes in decoding fear (Schyns et al., 2007; Schyns et al., 2009; Smith et al., 2005; van Rijsbergen & Schyns, 2009), reduced attention to the eyes of female faces has particularly important implications for the decoding of female distress, and could impede the unfolding of the empathy process (Marshall et al., 1995). Support for this proposal comes from research showing eye-gaze deficits to be related to impoverished empathy in boys demonstrating aggressive and antisocial behaviour (Dadds, Jambrack, Pasalich, Hawes & Brennan, 2011).

Eye-scan paths as a function of sex of expression: Mouths

In terms of fixation patterns to the mouths of male and female faces, non-IPV offenders looked comparatively more at the mouths of female expressions than did non-offenders, and there was a trend in the same direction for IPV offenders, although this did not reach significance.

The same interaction between participant group and attention to facial features for female relative to male faces was not reflected in overall dwell time parameters on these regions. This latter finding, in conjunction with differences in the number of fixations executed for facial features, implies that fixation durations differed between participant groups when viewing female and male faces. In particular, in comparison to controls, offenders may have made longer but less frequent fixations to the eyes of female relative to male faces and shorter but more frequent fixations to the mouths of female relative to male faces.

Overall, these findings show that violent offenders allocate visual attention differently to non-offenders when viewing facial expressions. These differences were observed when viewing male and female facial expressions and expressions of differing intensity. The strategies deployed by offenders were seemingly adequate for abstracting emotional information given that group differences did not emerge for recognition accuracy. However, such attentional biases could increase violent offenders' risk of decoding inaccuracies under different processing conditions, such as in an *in vivo* interaction when expressions are dynamic and/or expressed for shorter duration, or when executive functioning is compromised through intoxication or heightened emotional arousal.

Patterns of viewing behaviour were statistically similar for IPV and non-IPV violent men but there were some fine-grained differences between the two groups of offenders

relative to non-offending controls, with non-IPV violent offenders' eye-scan paths looking most different to controls.

The influence of psychopathology on facial affect processing

Group differences in psychopathology

As predicted, group differences in visual scanning behaviour were observed in light of group differences in psychopathology. Although IPV and non-IPV offenders were statistically similar to each other, they demonstrated different psychopathological profiles relative to controls, with IPV offenders demonstrating more pervasive psychopathology. In particular, IPV offenders scored significantly higher on all measures of negative affect relative to non-offenders, while non-IPV offenders only reported elevated state anxiety and depressive symptomology. Unexpectedly, neither offender group demonstrated elevated levels of psychopathy relative to non-offenders. Given previous research has implicated the role of callous traits in fear recognition impairment (e.g., Dadds et al., 2006; Gillespie, Mitchell et al., 2015; Stankovic, Nešić, Obrenovič, Stojanović & Milošević, 2015), the failure to detect group differences in the processing of fearful expressions may be due to the groups evidencing statistically similar levels of psychopathic traits.

In sum, similar to visual scanning behaviour, fine-grained differences between IPV and non-IPV violent offenders were seen for measures of psychopathology. However, the direction of these differences differed to that observed for eye-scan paths. Specifically, it was IPV offenders who looked most different to non-offenders on measures of psychopathology, in comparison to non-IPV offenders who looked most different to non-offenders on eye-scan paths. Consequently, subtleties in visual scanning behaviour do not appear to correspond to subtle differences in psychopathology.

The influence of psychopathology on eye-scan paths

Correlational analysis confirmed that differences in visual scanning behaviour could not be explained by psychological profiles of the groups, since eye-scan paths were statistically unrelated to levels of psychopathology following adjustment for a Type 1 error. This is inconsistent with previous research finding abnormal eye-scan paths in relation to anxiety (Horley et al., 2004; Moukheiber et al., 2010; Staugaard & Rosenberg, 2011) psychopathy (Dadds et al., 2008; Gillespie, Rotshtein, Wells et al., 2015) and depression (Loughland, Williams, & Gordon, 2002; Noiret et al., 2015) in non-offending samples, but consistent with the work of Elliot (2013) who found that the eye-scan paths seen among BPD patients were similar to those of healthy controls.

Notably, this study not only failed to replicate the relationship between callous traits and reduced attention to the eyes of expressions but, conversely, the trend was toward increased attention to the eyes for all three components of psychopathy. Seemingly, this has not been observed in previous published research. This, together with similar levels of psychopathic traits observed among offenders and non-offenders, raises questions about the measurement of psychopathic traits in the current research. First, it is important to acknowledge that a deceitful and manipulative interpersonal style characterises psychopathy, and that this may influence responding on self-report measures (Gillespie, Mitchell et al., 2015; Lilienfield & Fowler, 2006). Second, the average callous score for non-offenders in the current study (6.7) was above that reported in previous research, with mean scores found to range from 2.59 (Salekin, Chen, Sellbom, Lester & MacDougall, 2014) to 5.7 (Gillespie, Mitchell et al., 2015) in undergraduate students and could indicate a problem in the measuring of callous traits among the non-offenders[10].

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[10] This corresponds to a 'large' (1.69) and a 'medium' (.46) difference respectively using Cohen's *d* effect size.

Psychopathy was measured as a trichotomous concept; as recommended by Sellbom (2011) when using the LSRP in both prison and community samples. However, more recent research examining the three-factor model of psychopathy in non-offenders found that the callous factor did not map well onto previous models of psychopathy (Salekin et al., 2014). Significantly, Salekin et al. (2014) found that the callous scale was positively associated with neuroticism, which is contrary to the typical description of the primary psychopath as exhibiting shallow affect (Cleckley, 1941). Such findings therefore raise concerns about the convergent discriminant validity of the callous scale in the non-offending sample.

To the author's knowledge, this was the first study to examine the influence of psychopathy on facial affect processing among samples of offenders and non-offenders in the same experiment. There is no reason to propose differences in how psychopathic traits manifest in offenders and non-offenders given that prior studies have found psychopathic offenders to be qualitatively similar to psychopathic non-offenders (Mahmut, Homewood & Stevenson, 2008; Stankovic et al. 2015). However, separate analyses conducted as a function of offending status yielded results in the same direction as those found for the entire sample. Thus, exploring relationships between personality traits and facial affect processing across a mixed sample of offenders and non-offenders cannot explain the failure of this study to reveal relationships between psychopathology and visual attention.

Although literature exploring facial affect processing in relation to emotional disturbance is by no means unequivocal, with some studies finding increased attention to the eyes in individuals high in negative affect (e.g., Perlman et al., 2009) and some finding avoidance of the eyes (e.g., Horley et al., 2004; Moukheiber et al., 2010), it is useful to consider how methodological differences between the current research and previous research may have produced different results. In particular, participants in the current study were required to categorise emotion and thus eye-scan paths presumably reflect goal-driven

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fixation patterns (Elliot, 2013; Schurgin et al., 2014). Indeed, BPD participants did not demonstrate abnormal eye-scan paths when asked to categorise emotion in the study of Elliot (2013). To the author's knowledge, this was the first study to explore the relationship between anxiety and depression with attention to the eyes and mouth during an emotion categorisation task. It is therefore possible that the influence of psychopathology on visual attention is ameliorated when the individual is actively trying to search for emotional information.

In the current study, group differences in eye-scan paths were observed at the level of gender and intensity but associations between psychopathology and visual scanning behaviour were examined collapsed across intensity and gender. It is possible that an intricate pattern of relationships exists between psychopathology and eye-scan paths, differing as a function of intensity and sex of the expression, that were obscured through suppression effects in the overall analyses. Support for the existence of different patterns of relationships between psychopathology and expression intensity is provided by the hyper-arousal model of BPD (e.g., Daros et al. 2013). According to this model, high levels of arousal among BPD patients would positively affect accuracy under difficult viewing conditions (i.e., moderate intensity) but would adversely affect accuracy when the emotional expression is stronger due to hyper-arousal interfering with the ability to disengage attention from highly salient information (and thus to perceive the face holistically).

The influence of psychopathology on recognition accuracy

Contrary to predictions, analyses did not reveal significant relationships between psychopathology and recognition accuracy. This held for overall expression recognition and when the influence of psychopathology was examined for fear recognition only.

The lack of statistically significant relationships between psychopathology and facial processing variables could conceivably be explained by the subclinical nature of the current sample, since previous research finding an influence of psychopathology on facial affect processing in non-offenders have generally used clinical samples of depressed, anxious or BPD patients (e.g., Daros et al., 2013; Demenescu et al., 2010; Gur et al., 1992; Horley et al., 2004; Moukheiber et al., 2010; Perlman et al., 2009; Staugaard & Rosenberg, 2011). Furthermore, as alluded to previously, intricacies in the content and nature of deficits associated with various psychopathologies may have led to suppressor effects and interfered with the ability to detect relationships in the current research. This is particularly pertinent due to the comorbidity of psychopathology in the sample, as well as the exploration of relationships across expression type, gender and intensity. It is also important to consider the influence of stimulus presentation time. For instance, Mogg and Bradley (2005) propose that an attentional bias toward dysphoric stimuli in depression occurs at a more voluntary stage of processing than that found toward threat in anxiety, which, they propose, operates at an earlier, involuntary stage of processing. Indeed, Staugaard and Rosenberg (2011) found that different patterns of vigilance and avoidance of the eyes of threatening faces was seen in social phobic patients depending on exposure time. Consequently, significant relationships between psychopathology and facial affect processing variables may have been observed under different presentation times.

Limitations

The interpretation of the findings is constrained by a number of limitations of the study. First, IPV and non-IPV violent behaviour was not examined in the control sample. Given research finding that 13% of a nationally representative sample of men reported having perpetrated physical IPV during the previous two years (Graham, Plant & Plant, 2004), it is possible that violence perpetration in the control sample may have obscured findings.

Moreover, the pattern of results may be specific to the unique aspects of the sample, where non-offenders reported equal levels of psychopathic traits to offenders.

This study did not assess or control for a number of potentially confounding factors, including intelligence and socio-economic status (Jolliffe & Farrington, 2004), nor does it take into account a myriad of situational and emotional factors that have been found to modulate both the empathy process and IPV, such as alcohol consumption, heightened emotional distress, marital satisfaction and victim attributes (Borrill et al., 1987; Clements & Schumacher, 2010; Cohen et al., 2015; Decety, 2011). Illustrating the role of dyadic influences in the link between facial affect recognition and IPV, a recent study found that male-perpetrated IPV was influenced by both dyad members' emotion recognition abilities (Cohen et al., 2015).

Generally-violent IPV men were over-represented in the current study, with 3 in 4 of the IPV offenders having wider criminal histories. Although representative of prison samples (e.g., Herrero et al., 2016; Johnson et al., 2006) and consistent with typologies linking the severity of IPV perpetration to a wider antisocial trajectory (e.g., Holtzworth-Munroe & Stuart, 1994), it is not known whether the same results would have been observed in a sample of IPV-only prisoners. Indeed, to date, studies have highlighted the relevance of examining recognition abilities in relation to abusers' heterogeneity (Babcock et al., 2008; Marshall & Holtzworth-Munroe, 2010) but, unfortunately, the relatively small sample size of the current study did not for allow comparing of subtypes of IPV perpetrators in this way. Although this can be defended on the grounds that the research was concerned with exploring how IPV prisoners differ from other types of violent prisoners (in light of specialist treatment pathways), an investigation of subgroups of perpetrators could have provided a more nuanced understanding of the relationship between IPV and facial affect processing impairments, and

thus could have offered potentially important implications for more refined training approaches.

An obvious limitation is that the study did not examine the context of IPV perpetration and facial affect processing deficits are likely to be differentially implicated in IPV perpetrated to control a partner as compared to IPV perpetrated in the context of conflict. For instance, men who perpetrate IPV to gain control may be able to accurately decode affective information and use this to their advantage (e.g., Day et al., 2010). For such perpetrators, the breakdown in empathic responding may arise from deficiencies occurring at a later stage in the empathy process (e.g., a lack of emotional concern). In contrast, men who perpetrate violence in the context of conflict may misperceive their partner's affective displays as critical or rejecting, provoking fear that their relationship is threatened (e.g., Wolf, 2007) and increasing their risk of resorting to violence to regulate distress (e.g., Cohen et al., 2015; Pozueco-Romero, Moreno-Manso, Blázquez-Alonso & García-Baamonde, 2014).

The current findings are unrevealing about the relation of psychopathology with facial affect processing in female samples of IPV perpetrators. Psychopathic traits are thought to present differently in male and female samples (e.g., Coid, Yang, Ullrich, Roberts & Hare, 2009; Hare, 2003) and the degree to which this may impact upon visual attention is currently unknown (Gillespie, Rotshtein, Wells et al., 2015). Moreover, sex differences in visual scanning behaviour (e.g., Vasallo, Cooper & Douglas, 2009), and the experience of empathy and its consequences (e.g., Acitelli, Douvan & Veroff, 1993; Cohen et al., 2012; Cohen et al., 2015), further highlight that the results of the current study should not be generalized to female samples. Relatedly, given that both psychopathology featuring in IPV and patterns of facial affect processing have been found to differ across cultures (e.g., Boira & Jodrá, 2010; Catalá-Miñana, Walker, Bowen & Lila, 2014; Fernándex-Montalove & Echeburúa, 2008; Jack, Blais, Scheepers, Schyns & Caldara, 2009), caution is warranted when generalising the

findings to non-UK samples of abusers since psychopathology could have a different relationship with eye-scan paths and emotion recognition accuracy.

Conclusion

This study filled an important gap in the literature by examining the link between dimensions commonly associated with IPV and eye-scan paths when viewing emotional faces to examine whether abnormal eye-scan paths are a mechanism underpinning facial affect impairment in IPV perpetrators. The results revealed abnormal eye-scan paths in IPV offenders relative to non-offenders in the categorising of male and female emotional expressions and moderate and high intensity expressions that could put them at risk of misconstruing emotional displays. Although no corresponding recognition deficits were observed, similarities in psychopathic personality characteristics of the control group and offender groups are notable and may have obscured between-group differences. Consequently, deficits in visual-scan paths remain a feasible mechanism underlying the emotion recognition deficits typically observed in violent offenders. However, this study did not find convincing evidence for personality characteristics influencing eye-scan paths or recognition accuracy, at least in the processing of fearful or overall emotional displays.

The study extends prior research finding that individual characteristics found for IPV are similar to those found for general violence (e.g., Felson & Lane, 2010; Moffit et al., 2000; Straus & Medeiros, 2002) by showing that IPV offenders were similar to non-IPV offenders in their facial recognition accuracy, eye-scan paths and psychopathology related to facial processing. As such, the findings extend support for the "violence perspective" (Felson, 2006), which proposes similarities in the etiologies of violence perpetrated against an intimate partner and general violence. However, it is important to acknowledge that fine-grained differences between IPV and non-IPV violent offenders emerged in their patterns of

processing and psychopathology relative to non-offending controls. Although these differences were not sufficient to produce group differences in facial affect recognition, replication of the findings using partner's facial expressions would instil confidence in the conclusion that IPV and non-IPV offenders do not differ in their facial affect processing.

Implications for practice

Repairing emotional decoding deficits should facilitate the understanding of a potential victim's distress, which is a necessary, although not sufficient, component to achieving empathy.

Previous studies have shown promising results for the efficacy of training approaches in improving facial affect recognition, and a subsequent reduction in the frequency and severity of violent behaviour (e.g., Hubble et al., 2015; Penton-Voak et al., 2013; Schönenberg, Christian et al., 2014). However, the development and implementation of such strategies has been hindered by a poor understanding of the processes underlying recognition impairments, and thus insufficient knowledge about the components necessary for generating improvements.

The findings of the current study provide evidence for abnormal visual scan paths in facial affect processing in IPV and non-IPV violent offenders and thus support the value of training techniques that promote more efficacious visual scanning behaviour in order to improve the ability to abstract emotional information from facial cues. As processing abnormalities were seen according to the sex and intensity of expression rather than as a function of the emotion expressed, the efficacy of training approaches could be maximised through enhancing, either implicitly or explicitly, attentional strategies deployed in the viewing of female and moderate intensity facial stimuli, particularly in relation to increased attention to the eyes, rather than a focus on promoting recognition of expression-specific

facial features. Through a focus on attentional strategy more generally, rather than facial configurations specifically, the improvements obtained should be more likely to transfer to novel stimuli and settings.

Given the similarity observed between IPV prisoners and non-IPV prisoners in their patterns of facial affect processing, this study provides little empirical justification for training approaches to be designed differently for IPV and non-IPV violent offenders, at least in enhancing the recognition of strangers' expressions. At present, it is speculative whether improvements would generalize to partner expressions and further work is needed to elucidate whether there would be a need for partner-specific training approaches. Indeed, given that a substantial proportion of IPV prisoners have perpetrated non-IPV violence, principles of attentional deployment could be a promising treatment target for not only ameliorating recognition deficits associated with IPV but also for reducing deficits associated with violence directed toward non-intimates. However, since this study did not find corresponding recognition deficits in violent offenders, further work is needed to support the rationale for targeting abnormal attentional deployment as part of emotion recognition and victim empathy modules in treatment.

Future directions

While psychopathology appears insufficient as an explanation of processing deficits in violent offenders, this study only examined psychopathology characteristics that are known to be related to facial affect processing. Further research should look to extend investigations of psychopathology to other personality pathologies implicated in IPV and non-IPV violence, including narcissistic personality disorder (e.g., Baumeister, Smart & Boden, 1996), and Cluster A and Cluster C personality disorders (Ehrensaft, Cohen & Johnson, 2006). There is also a need for further research examining the dynamics by which eye-scan paths and

personality may operate to influence facial affect processing in female IPV perpetrators and subgroups of IPV perpetrators, as well as whether and how deficits are modulated by emotional arousal.

Finally, although this research did not find differences in recognition accuracy, the findings are unrevealing about whether the nature of errors made by IPV and non-IPV offenders differs. Future research should look to extend these findings to other indices of facial affect recognition, including attribution biases and sensitivity.

The replication of these findings in the aforementioned research will have important implications for the development of effective treatment modules targeting the emotional component of IPV and non-IPV violence.

Chapter Four

Critique of a psychometric assessment: The revised Conflict Tactics Scales (CTS2)

Introduction

One of the most commonly used measures of intimate partner violence is the revised Conflict Tactics Scales (CTS2; Straus, Hamby, Boney-McCoy & Sugarman, 1996). This chapter reviews the CTS2 in terms of its scientific properties, focusing on its research uses for assessing IPV perpetration. First, an overview of the CTS2 is presented, including the area that it assesses, the purpose of the tool, and its content. Second, the tool's attempts to measure the purported construct are evaluated, drawing upon principles of reliability, validity and appropriate norms.

Overview of the area assessed by Conflict Tactics Scales (CTS)

Although conflict denotes negative ideation such as "war" and "aggression" (Ledlow, 2009), conflict theorists regard conflict as a natural part of relationships (Adams, 1965; Coser, 1967; Dahrendorf, 1959). Such theorists maintain it is not the conflict itself that poses a threat to relationships but tactics that are employed to resolve it (i.e., "conflict tactics") (e.g., Coser, 1967; Dahrendorf, 1959; Fincham & Beach, 1999). In intimate relationships, conflict managed constructively can help to foster satisfaction and intimacy (Fincham & Beach, 1999; Simmel, 1920, cited in Lilly, Cullen & Ball, 2014, p.180). However, conflict managed through physical or psychological aggression can have a detrimental impact on victims and relationships, and, in the context of an intimate relationship, this is coined 'Intimate Partner Violence' (IPV).

History of CTS development

Underpinned by the theoretical framework of conflict theory (Adams, 1965; Coser, 1967; Dahrendorf, 1959; Straus, 1979), the CTS (Straus, 1979) was designed to be an objective instrument providing data on the prevalence and chronicity of tactics employed by

partners to resolve conflict in a dating, cohabiting or marital relationship. The first version of the scales was developed through data obtained from questionnaires administered to university students about assaults between their parents (Straus, 1974).

In 1996, the scales were revised in light of critiques and on the basis of research and clinical work (CTS2; Straus et al., 1996). They were further developed using data derived through the National Family Violence Survey (Straus, 1979) and through questionnaires administered to students about their own partner violence. The primary changes included: clarifying the wording of items; increasing the number of items for enhanced content validity and reliability; replacing some items; improving the distinction between minor and severe acts; including scales to measure sexual coercion and injury (i.e., consequence); replacing the weakest original scale (reasoning) with negotiation; and interspersing the order of questions to reduce response sets (Straus et al., 1996).

Application of the CTS2

The scales have been used in multiple contexts, including evidence-based initiatives to inform IPV treatment and policy (Dixon & Graham-Kevan, 2011), in therapy to assist disclosure (O'Leary & Murphy, 1992), and in correctional settings to monitor behaviour and treatment progress (Straus, 1993). The CTS2 is also used as the primary measure of IPV in research (Capaldi et al., 2012; Schwartz, 2000), and was found by Thompson and colleagues to be the only measure capturing the extent of IPV through its measurement of multiple forms of perpetration and victimisation (Thompson, Basile, Hertz & Sitterle, 2006).

The scales have been used on participants from diverse cultural backgrounds, including African Americans and Hispanic Americans, in over 20 different countries (see Straus et al., 1996), and they have been translated into at least 15 different languages, including Chinese, Hebrew and Zulu (Straus, 2004).

Consequently, understandings of IPV are largely based on the CTS/CTS2, and data derived therefrom play an important part in research, policy and practice. It is therefore important that the scales' theoretical bases and psychometric properties are scrutinised for understanding the validity and reliability of conclusions drawn from research utilising the CTS2.

Overview of measure

The CTS2 is a 39-item, self-report questionnaire devised to assess the nature and frequency of tactics used by partners to manage conflict in an intimate relationship. It is designed to be understood by persons with a 6th-grade reading ability, and its simple format allows it to be fully administered in 10-15 minutes (Straus et al., 1996).

Using a Likert scale, respondents are asked to rate how frequently they have perpetrated a stated act, and how frequently they have been victim of that act by their partner over a specific referent period. By measuring both perpetration and victimisation, the scales are purported to take into account reciprocal violence and recognise that violence perpetration might be dependent on violence victimisation (Feld & Straus, 1989). The standard referent period is 'during the past year' but this can be modified according to its application purposes (Straus et al., 1996). The CTS2 can also be adapted to measuring IPV occurring during a particular event or situation; although this does not then allow overall prevalence rates to be inferred (Straus et al., 1996).

Response format

The response options are: 1 = once; 2 = twice; 3= 3-5 times; 4 = 6-10 times; 5= 11-20 times; 6 = more than 20 times; 7 = not in referent period but happened before; 0 = never. The scores can be recoded using the mid-points of items to create a measure of frequency. As

with the referent period, adaptations for scoring are also possible. The authors of the scales note that a quantitative response format is preferable since different meanings can be inferred from terms such as "*often*" and "*frequently*", thereby reducing the validity of between-respondent comparisons (Straus et al., 1996; Straus, 2012). Scoring lends itself to the measurement of two variables; a prevalence variable and a chronicity variable. The prevalence score enables a researcher to say, for example, that a certain percentage of a group had physically assaulted a partner, whilst the chronicity variable might be more valuable for measuring treatment efficacy.

The CTS2 has scales developed to measure three tactics that are frequently employed in conflicts between partners; physical aggression, verbal aggression and negotiation. It also has supplementary scales derived to measure injury and sexual coercion. The various scales can be selected to suit the purpose at hand. Each of the scales contain two subscales, minor and severe behaviours, and emotional and cognitive scales for negotiation. Information about the scales is provided in Table 9.

The flexible application of the CTS2 and the resultant nature and number of variables available for measurement allows for relevant data to be obtained to suit its research purposes (Straus, 2012). However, such adaptations make it difficult to compare across studies and caution is therefore necessary when applying psychometric properties of the standard format to its derivatives. Straus et al. (1996) note, however, that the CTS1 was found to be robust to modifications (e.g., Pan et al., 1994), and to produce findings that were comparably the same as the original format.

Table 9. Information about the scales and items comprising the CTS2

Scale	Development and definition	Items
Negotiation	Replaced 'reasoning' scale of CTS1. Examines frequency of discussion tactics employed to settle conflict, and level of concern that they show their partner through cognitive and emotional techniques.	6 items: 3 emotional e.g., "*I showed my partner I cared even though we disagreed*"; 3 cognitive e.g., *I explained my side of a disagreement to my partner*"
Psychological aggression	Replaced 'verbal aggression' scale. Asks about frequency of tactics used that cause psychological distress to partner, including verbal and non verbal aggressive acts.	8 items: 4 minor e.g., "*I shouted or yelled at my partner*"; 4 severe e.g., "*I threatened to hit or throw something at my partner*"
Physical assault	Asks about physical aggression and physical tactics used.	12 items: 5 minor e.g.," I *slapped my partner*"; 7 severe e.g., "*I choked my partner*"
Sexual coercion	Asks about the frequency of behaviour intended to coerce partner to engage in unwanted sexual activity.	7 items: 3 minor e.g., "*I insisted on sex when my partner did not want to (but did not use physical force)*"; 4 severe e.g., "*I used force (like hitting, holding down, or using a weapon) to make my partner have sex*".
Physical injury	Asks about physical injury received/inflicted due to physical conflict. Severity is assessed by asking about the need for medical attention.	6 items: 2 minor e.g., "*I had a sprain, bruise, or small cut because of a fight with my partner*"; 4 severe e.g., "*I had a broken bone from a fight with my partner*".

Psychometric properties of the CTS

Although Straus et al. (1996) argued that the evidence supporting the validity of the CTS1 could apply to the CTS2 due to their conceptual and methodological similarities, for the purpose of this critique, only the properties of the CTS2 are examined due to the number of alterations that were made when the scales were revised (as previously highlighted).

Instrument characteristics

The standard level of measurement for the CTS2 is ordinal level data, which provides units for analysis. The severity variable can be used to classify respondents into mutually exclusive categories of 'no violence', 'minor only', or 'severe'. Thus, it can be used as a nominal variable or a three-level ordinal scale (Straus & Douglas, 2004).

The instrument is designed for self-report. Notwithstanding the benefit of ease of administration, the validity of the CTS2 is undermined by biases inherent in self-reporting, including memory bias and response bias (Junger-Tas & Marshall, 1999). Specifically, respondents must be both willing to and able to admit to the act (i.e., they must be honest and they must be able to recall correctly).

As the CTS2 measures behaviours that are socially unacceptable and punishable by law, respondents may not be willing to respond truthfully. This is particularly pertinent in community samples, who are keen to present in a prosocial manner, and could be expected to have greatest impact on the reporting of more serious acts in this population (see Junger-Tas & Marshall, 1999). For incarcerated populations, however, the reliability and validity of self-report data have been found to be higher than police data (Chaiken & Chaiken, 1982). Thus, the impact of social desirability effects on reporting IPV may vary according to the sample studied. That said, a meta-analysis exploring IPV reporting and social desirability found

relatively small negative associations between the two constructs (Sugarman & Hoating, 1997) and, consistent with this, Straus (2004) found little correlation between social desirability scores and the CTS2. Indeed, threats posed to validity through impression management can be managed through anonymous reporting in research, although this would not be feasible in a therapy or correctional context.

There is evidence to suggest that less severe acts may be more easily forgotten, and that more frequently perpetrated offences are more likely to be underreported (Junger-Tas & Marshall, 1999); something which Straus himself acknowledges as an issue with the scales (Straus, 2012). This latter finding has implications for incarcerated populations, who could be assumed to have perpetrated acts with greatest frequency. Although limiting the referent period to a shorter time-frame could help to reduce inaccuracies caused by memory biases, this does not avoid problems with memory for temporal sequencing (Junger-Tas & Marshall, 1999). As such, respondents might incorrectly judge acts to fall inside or outside the referent period, serving to distort data obtained. Indeed, memory has been found to be particularly problematic when respondents are asked to recall quantitative facts (Junger-Tas & Marshall, 1999), which further threatens the validity of the chronicity variable of the CTS2.

Reliability

Internal Reliability

Internal reliability refers to the extent to which items measure the same construct. In the pilot study of the CTS2, the scales were found to have good internal consistency, with coefficients as high or higher than those reported for the CTS1 (Straus, 1996). Specifically, scales ranged from .79 (psychological aggression) to .95 (injury). Straus et al. (1996) note that the psychological aggression scale has the lowest internal consistency because some items were selected to increase the diversity of its content as opposed to enhancing its

internal consistency. Thus, the authors note that the scale attempts to balance internal consistency with representation of different forms of psychological aggression. Across 41 papers published up until 2005, the mean reliability coefficient was found to be .77 (Straus, 2005). However, alpha coefficients as low as .34 were reported in samples where behaviours were altogether absent, such as attacking a partner with a knife or gun.

The internal consistencies of individual scales were found to be even greater among an incarcerated population of Spanish males (.80 - .83). However, the injury scale showed low reliability in this sample (.59) (Loinaz, Echeburua, Ortiz-Tallo & Amor, 2012). Tuomi Jones, Ji, Beck and Beck (2002) found moderate to excellent reliability for each of the scales using a sample of incarcerated women (.62- .91). The coefficient was lowest for the sexual coercion scale, which was also found to be the case in a study by Yun (2010). However, in Yun's (2010) community sample of females, a coefficient as low as .18 was reported.

Cross-cultural reliability

The CTS2 has good cross-cultural reliability, at least among college samples. Straus (2004) pooled data from 33 studies across 17 countries representing every major world region except Africa and found that even the lowest coefficient surpassed "good" reliability (.70). Small differences were found between male and female students, with the scales having slightly higher reliability for male students (.78- .93 compared to .72- .87 for female). More recently, cross-cultural reliability has been confirmed using other populations, including Spanish IPV men (Loinaz et al., 2012) and an Italian female community sample (Signorelli, Arcidiacono, Musumeci, Nuovo & Aguglia, 2014).

Inter-rater agreement

Inter-partner agreement scores have been found to range from just short of medium to large, depending on the strategy used to determine reliability (Vega & O'Leary, 2007). Perhaps not surprisingly, higher partner-agreement has been found on more objective and specific items, as defined by the extent to which an independent observer could identify the act as having happened or not (Simpson & Christensen, 2005).

Test-retest reliability

Test-retest reliability refers to the extent to which scores are consistent over time. Among a sample of convicted IPV offenders, Vega and O'Leary (2007) found strong stability for physical assault ($r = .76$), injury ($r = .70$), psychological aggression ($r = .69$) and negotiation ($r = .60$). However, they found low stability for the sexual coercion scale ($r = .30$). Using a slightly adapted version of the CTS2, Goodman et al. (1999) examined temporal consistency in the reports of participants with mental illness and found good consistency for the scales assessed (physical assault, sexual coercion and injury) across both genders (79-90% for women and 62-81% for men). There has been minimal research exploring test-retest reliability for the CTS2, and thus Straus, Hamby and Warren (2003) recommend drawing comparisons between those of an individual and that observed in a similar group.

Validity

Face validity

Face validity refers to the extent to which a test appears to measure what it is supposed to measure. It includes the wording of items and how this might affect responding. To improve the scales' face validity, the authors of the CTS2 amended the wording of the

original CTS, making it more explicit. Moreover, the CTS2 balances face validity with demand characteristics by interspersing the order of the questions, which helps to reduce response sets (Dahlstrom, Brooks & Peterson, 1990). Indeed, Ramirez and Straus (2006) found that presenting questions in a slightly modified order to university students resulted in higher disclosure rates for physical assault, injury and sexual coercion, as compared to presenting questions in a sequential order, possibly owing to the redundancy of response sets.

Concurrent validity

Concurrent validity is indicated by the correlation of the CTS2 with other measures of the five constructs (i.e., negotiation, physical assault, psychological aggression, sexual coercion and physical injury). Few studies have examined the concurrent validity of the CTS2. In 2004, all of the five studies that had examined the concurrent validity of the CTS2 found that the scales correlated with other measures of roughly the same constructs (Straus, 2004).

Comparison of the CTS2 scores with official sources can be used to provide a reference point for concurrent validity (Erickson & Empey, 1963). The CTS2 has been linked to increased disclosure rates relative to other measures of IPV, such as the National Crime Victimisation Survey (Straus, 2007), which could be a testament to the sensitivity of the measure. Indeed, a sensitive measure (i.e., its ability to detect the presence of a phenomenon) is particularly crucial for self-report measures of undesirable behaviour (Straus, 2007).

Due to the largely held view of the CTS as the "gold standard" for IPV measurement (e.g., Kraanen, Vedal, Scholing & Emmelkamp, 2013), the CTS2 itself has been used to assess the construct validity of other measures. For example, significant correlations have been found between the CTS2 and the Jellinek Inventory for assessing Partner Violence (J-IPV; Kraanen et al., 2013), a screening tool for measuring victimisation and perpetration of

IPV over the past year. Significant correlations have also been found between the scales of the CTS2 and the Abusive Behaviours Checklist (Beck & Beck, 1998) and the Abusive Behaviour Inventory (Shepard & Campbell, 1992) (.71 -.76; Tuomi Jones et al., 2002; Zink, Klesges, Levin & Putman, 2007, respectively). However, it is not possible make inferences about the concurrent validity of the CTS2 based on these correlations without making assumptions about the validity of the newer tests.

Predictive validity

The CTS2 was not devised to be a predictive measure (Straus et al., 2003). However, it measures past behaviour and past behaviour is often said to be the best predictor of future behaviour (see Ouellette & Wood, 1998).

The Spousal Assault Risk Assessment (SARA; Kropp, Hart, Webster & Eaves, 1995) identifies a number of risk factors for IPV perpetration, and, whilst this includes many factors measured by the CTS2 (such as physical and sexual assault), it also includes factors which are not (e.g., employment problems). This suggests inadequate predictive validity of the CTS2 when used in isolation.

Content validity

Content validity refers to the extent to which a measure reflects the entire construct that it is purporting to examine. The CTS2 was derived to assess all aspects of IPV, thereby covering physical and psychological abuse and sexual coercion. However, for practicality, the CTS2 can only include a sample of a limitless number of violent behaviours (Straus, 2007). Although the questions themselves can be assumed to be valid since they ask about behaviour, this does not mean that the strategy used to select the items (i.e., qualitative

interviews, suggestions and reviews) ensured that a sufficient sample of acts were represented in the measure (Straus, 2007).

Indeed, in the measure's development, the authors included items that they considered to be "inappropriate" (Straus et al., 2003, p. 8) and only included acts that are common to all couples (pet-related aggression, for example, is not included). It is noted, however, that Dobash & Dobash (1984) derived a list of violent acts from qualitative methods which was essentially the same as the CTS items. According to Straus (1990), this provided evidence for an adequate coverage of violent acts represented in the CTS.

Construct validity

Construct validity refers to the extent to which a test measures what it is proposed to measure. It can be examined by exploring the instrument's correlation with other variables that are known, or expected, to be theoretically associated with the construct purportedly measured (Campbell & Fiske, 1959; Straus et al., 1996). Although the overarching construct of the CTS is conflict tactics, the scales assess four different areas of tactics, and thus construct validity of the CTS2 is best understood by examining each of the scales (Straus et al., 1999).

First, a core premise of conflict theory is that inequality between persons increases the risk of violence, which is used as a means for the dominant person to maintain their position or for the subordinate person to balance power (Coser, 1967; Dahrendorf, 1959). In line with this, positive correlations have been found between dominance and physical assault scores, irrespective of gender (Straus 2004). Second, consistent with empirical evidence indicating that childhood physical abuse is a risk factor for later violence (e.g., Widom, 1989), Straus (2004) found that corporal punishment in childhood correlated with physical assault perpetration scores.

In terms of correlations that would be expected between subscale scores, Straus and colleagues found that high physical assault perpetration rates correlate with high injury rates, and, in accordance with gender differences in size and strength (e.g., Archer, 2000), a higher correlation between these scores was found for male respondents. Psychological aggression and physical assault scores were also highly correlated and a low correlation was found between negotiation and sexual coercion and injury (Straus et al., 1996).

Whilst Straus and colleagues have argued that the quantitative and objective stance of the CTS2 is a strength as it limits minimisation, denial or distorted cognitions (e.g., Straus et al., 2003), others have argued that motives and meaning are vital for making sense of behaviour, and thus determining whether the behaviour constitutes IPV (e.g., Kimmel, 2002). In support of the latter, research employing interview data found that 58% of female undergraduates were miscategorised using the CTS2 due to their having engaged in mock violence; which, objectively, would meet the criteria of the behaviour-based CTS2 (Lehrner & Allen, 2014). Furthermore, one study found that 78% of 'victims' considered every act of physical aggression they received from their partner as evidence of their partner "playing around" (Jouriles, Platt, & McDonald, 2009), and, similarly, another study found that over one third of female victims of violent acts did not consider themselves to have experienced "physical abuse", as a "victim of violence" or as a "battered woman" (Hamby & Gray-Little, 2000).

Lehrner and Allen (2014) argue that the validity of the interview data obtained can be inferred from participants' willingness to report incidents of intentional violence, as well as from research finding that play violence is frequent in dating relationships (e.g., Perry & Fromouth, 2005; Ryan & Mohr, 2005). Although aggressive play has been found to be related to risk of violence by intimate partners (Gonzalez-Mendez & Hernandez-Cabrera, 2009), Lehrner and Allen (2014) argue that playful violence in this context is not evidence of

a conflict tactic, which the CTS2 purports to assess. Such findings raise concerns that the CTS2's focus on behaviour without context can inflate rates of IPV in this population (i.e., female undergraduates) (Lehrner & Allen, 2014). Indeed, although the CTS2's instructions specify acts used during an "argument", it is clear that respondents do not reliably distinguish between acts that occurred inside and outside of conflict (Lerhner & Allen, 2014).

A related issue is that, by limiting IPV measurement to acts used in the context of an argument, the CTS2 has a limited coverage of IPV, failing to measure acts used to control a partner, for example (Dobash, Dobash, Wilson, & Daly, 1992; Foshee, Bauman, Linder, Rice & Wilcher, 2007; Sillito, 2012). Furthermore, despite acknowledging the mutuality of violence, the CTS2 does not attempt to match acts to a particular event or determine the ordering of these events (Britton, 2011). Consequently, an act of self-defence would receive the same score as an act of instigated violence and thus its reputation as a measure of reciprocity has been classed as misleading (e.g., Britton, 2011; Krahé, Bieneck & Möller, 2000).

To summarise, the scores of the CTS2 cannot reliably distinguish between acts that reflect conflict tactics (deliberate or self-defence) or acts used outside of conflict (controlling or playful behaviour). Thus, by limiting contextual information, the CTS2 loses valuable information about the nature of behaviour, which ultimately impacts upon its discriminant validity. In response to these issues, the authors of the CTS2 have argued that the purpose of the measure is to assess rates of IPV perpetration, not context, highlighting that the CTS2 is intended for use in conjunction with other tools to make sense of the scores (Straus et al., 2003). Furthermore, Straus (1990) has argued that measuring context alongside behaviour makes assumptions about a relationship.

At the very least, the discrepancies noted above highlight the need for a more clearly defined construct. They also demonstrate the complexity of defining and measuring IPV (Waltermaurer, 2005). With these caveats in mind, multi-modal methods incorporating interview data have been proposed for screening and assessment of IPV (see Lehrner & Allen, 2014).

Further factors threatening the construct validity of the CTS2 include that, as standard, it assesses conflict tactics employed in the last 12 months and only in the current relationship. Conflict tactics measured using these instructions give a limited overview of IPV and assume heterogeneity in behaviour across both time and relationships (Kimmel, 2002; Lehrner & Allen, 2014). Another factor, and one which Straus and colleagues have identified as a reason for differing IPV rates obtained in research (Straus et al., 2003), relates to how the instrument is presented, such as the instructions given. Indeed, Hamby and Finkelhor (2000) reported that advertising the CTS2 as a 'crime survey' rather than a 'family survey' affects reporting. This is perhaps not surprising given research demonstrates that wording can serve as a cue for recall or bias memory (see Junger-Tus & Marshall, 1999).

Finally, research carried out by Loinez et al. (2012) demonstrates convergent and discriminant validity of the CTS2. In terms of the former, the researchers found significant relationships between conviction of physical assault against a partner and the overall frequency of reported physical violence. What is more, the severity of reported physical assault was significantly related to conviction for physical assault. In terms of discriminant validity, the CTS2 differentiated the IPV men from the general population on all scales, except the sexual coercion scale, where there were no significant group differences. Furthermore, only a *small* difference was found between offenders and non-offenders on the negotiation scale (as measured by Cohen's *d*).

Factor structure

The factor structure of the CTS2 has been largely explored using female samples. For example, Lucente and colleagues found support for the five-factor model using incarcerated female substance abusers (Lucente, Fals-Stewart, Richards & Goscha, 2001), while Signorelli, Arcidiacono, Musumeci, Nuovo and Aguglia (2014) found evidence for a five-factor solution (corresponding to negotiation, violence, extreme violence, injury and sexual coercion) in an Italian female community sample. However, Yun (2010) tested the factor structure of the 10-factor model (two categories for each scale) in a female community sample and found that the factors were closely related across subscales. Yun (2010) also reported a lack of exclusive factor loadings between the minor and severe scales for this sample.

Other researchers have suggested that the CTS2 could be better constructed in a four-factor model, although the scales forming this model have varied across research. For example, Tuomi Jones et al. (2002) combined psychological and physical scales to produce a four-factor solution in a sample of incarcerated women, whilst Loinez et al. (2012) found that physical, sexual, psychological violence and negotiation explained 51.4% of the total variance in a sample of convicted IPV men. However, some items were found to load onto more than one factor, thereby demonstrating overlap between the types of violence. For example, "*I damaged something that belonged to my partner*" was reported to load onto two factors corresponding to physical and psychological aggression.

Newton, Connelly & Landsverk (2001) found that a five-factor model using minor and severe categories for psychological and physical aggression, and negotiation produced a better fit of the data than did a three-factor model combining minor and severe scales of psychological and physical aggression for a sample of high-risk postpartum women.

Although including both severities in this way means that the scores are not biased by minor acts, even within each category (i.e., minor and severe) the items cover a range of severities (Newton et al., 2001). In line with this, factor analyses have frequently shown that the weapon items form a distinct factor from the other items (Straus, 1979, 1990).

In summary, research has not consistently supported the original five-factor structure of the CTS2. The factor structure has been found to vary according to gender (Schafer, 1996) and in samples characterised by high levels of aggression (e.g., Tuomi Jones et al., 2002), which could explain some of the inconsistent findings.

Normative samples

A normative sample is a group of people assumed to be representative of the larger population who may utilise the measure. The norm group's data are utilised as a reference for evaluating future scores obtained on the measure.

College students comprise the reference sample of the CTS2 and it is recommended that this sample is used to compare the data of other college students (Straus et al., 2003). However, the prevalence of IPV is higher in college students than in married couples. For example, Stets & Straus (1989) found rates of 25-30% in the former relative to 16% for the latter, and incarcerated populations have yet higher perpetration rates (Tuomi Jones et al., 2002). Thus, whilst it is important to have a measure that applies to this population, the authors acknowledge that more normative groups are needed to compare data obtained from respondents who fall outside this population (i.e., primarily white, middle-class, educated, young adults). Indeed, the CTS2 has frequently been administered to clinical populations, including, men with alcohol use disorders (Panuzio et al., 2006) incarcerated female substance abusers (Lucente et al., 2001) and incarcerated IPV men (Loinaz et al., 2012).

Standardised scores are not provided for the CTS2 as it is not intended for diagnostic purposes. However, the authors do advise that a score of one or more on the physical scale warrants further exploration and intervention (Straus, 2007).

Conclusion

The CTS2 it is a versatile tool that can be used in a variety of ways in a number of settings. Despite a relative dearth of research examining the psychometric properties of the CTS2 in comparison to the CTS1, it has been found to be a reliable and valid instrument to measure IPV across different populations and across different cultures. However, there are some concerns regarding the internal consistency and discriminate validity of the sexual coercion scale, and explorations of the factor structure of the CTS2 have yielded inconsistent models.

As some psychometric properties of the CTS2 have been found to vary according to gender and level of aggression in the sample, it is important not to over-extrapolate the findings. Although some statistical properties of the scale have indeed been established for different populations, including incarcerated female substance abusers and incarcerated IPV men, more research is doubtlessly needed to ascertain the validity and reliability of the CTS2 in both community and incarcerated samples of males and females. This will be important for the scales' reputation as the "gold standard" of IPV measurement to be upheld, and is paramount given the measure's frequent use in identifying IPV.

IPV is a challenging phenomenon to define and measure (Waltermaurer, 2005). Whilst the behaviourally-based CTS2 is able to objectively identify acts suggestive of IPV, it is clear that accuracy in identifying IPV perpetration extends beyond simple administration and requires an understanding of the context in which the behaviour took place (Waltermaurer, 2005). Although the CTS2 could be criticised for being reductionistic in its

sole focus on the presence of an act and largely ignoring the context in which the act took place, it does afford measurement of the type, severity and frequency of a range of conflict tactics, and thereby enables some differentiation of individuals' IPV perpetration.

Referent periods used in IPV measurement have an important role in determining understandings of the incidence or prevalence of IPV. Thus, Waltermaurer (2005) notes that researchers utilising the CTS2 and selecting referent periods for IPV measurement need to be mindful of their goals, since the time-frames used to determine IPV can essentially measure different types of abuse (i.e., within or across relationships). Researchers also need to be aware that adaptations of the scales will limit comparability with other studies of IPV and influence the extent to which psychometric properties can be applied. Nevertheless, Waltermaurer (2005) highlights that instrument consistency should not be at the cost of adding to the growing understanding of IPV. The strengths and limitations of the CTS2 outlined in this chapter have important implications for interpreting findings of studies investigating IPV using only this tool.

Chapter Five

Discussion

This chapter summarises the work reported in this thesis. The main empirical findings are reviewed and recommendations for research and practice are made.

The inadequate treatment efficacy of Intimate Partner Violent (IPV) interventions indicates that more needs to be done to both understand and target the criminogenic needs of this population of offenders. This thesis aimed to provide a comprehensive investigation of facial affect processing in violent offending, specifically focusing on how the abilities of IPV prisoners differ from those of other violent offenders. In doing so, it adds to academic understanding of the shared and unique correlates and risk factors of IPV and non-IPV violent offending.

Chapter one illustrated that the emotional component of IPV is poorly understood. That was discussed in relation to the prevailing conceptualisation of IPV as a special form of violence borne out of patriarchy, thereby placing exclusive emphasis on the macrosystem, and largely neglecting the role of individual factors in IPV perpetration. Such conceptualisations of IPV as a special form of violence are increasingly undermined by research showing considerable overlap between IPV and non-IPV violence. More recent conceptualisations of IPV acknowledge its complexity and articulate the role of risk factors operating at various ecological levels, including that of the macrosystem (Dutton, 2006). This more comprehensive understanding of IPV leaves open the possibility of both similarities and differences in IPV and non-IPV violence, and raises the question of whether IPV offenders are similar or different to other types of violent offenders in emotion recognition processing. Chapter one discussed the implications of emotion recognition deficits for achieving empathy and, relatedly, for facilitating harmful behaviour. Facial expressions were introduced as the primary channel of emotional communication and a dearth of research exploring facial affect recognition in IPV samples, particularly prison samples, was highlighted.

Chapter two synthesised research investigating facial affect processing in violent offenders. The rationale for the review was to identify patterns of impairment commonly seen in violent prisoners, from which those found in IPV prisoners could subsequently be compared. A previous review found that antisocial populations (including community samples of adults and children) exhibited significant deficits in recognising fearful, sad, and surprised expressions, and that deficits in recognising fear were significantly greater than other impairments (Marsh & Blair, 2008). Through its specific focus on violent prisoners, the review presented in this thesis extends the work of Marsh and Blair to populations demonstrating more severely harmful behaviour. That was considered important in order to elucidate the treatment needs of the population that pose greatest harm to society and for which custodial interventions are designed to treat. In addition to investigating how deficits of violent offenders differ from non-offending controls, a key question concerned whether violent offenders differ in their recognition abilities relative to non-violent offenders. This question addresses whether specific patterns of facial affect recognition deficits are observed in violent offending over that associated with rule-breaking more generally, and begins to explore how patterns of impairment may put an individual at risk of a particular form of offending. The review also explored whether deficits observed in violent offenders differ according to whether sex offenders are included or excluded from the violent sample, given the unique risk factors implicated in this form of violent offending.

Findings from seven studies were synthesised across indices of recognition accuracy, sensitivity and response bias. The review indicated that violent prisoners demonstrate impaired recognition of negative affect, with deficits in fear, anger and disgust being most reliably reported. Violent offenders also showed a hostile bias toward perceiving anger in ambiguous stimuli containing proportions of an angry expression and were less likely than non-offenders to interpret a neutral expression in prosocial ways. Generally, the recognition

abilities of violent offenders were more impoverished than those of non-violent offenders, although no consistent deficits were observed across studies. Also, studies of violent offenders which included sex offenders were more likely to find deficits in disgust recognition.

Although conclusions are limited through the small number of studies and publication bias, the review concluded that violent male prisoners show deficits in the recognition of others' negative expressions that could put them at risk of inappropriate responding. The review also found evidence for patterns of impairment differing between subgroups of offenders, raising important questions about whether IPV offenders would show their own idiosyncratic processing patterns of recognition impairment, as well as how such patterns of impairment could place an individual at risk of a particular form of offending. The review highlighted the potential value of incorporating facial affect recognition training into treatment for violent offenders in order to foster more accurate labelling of emotional cues and thus pave the way for more appropriate responding to such cues. At the same time, it highlighted that a greater understanding of the mechanisms underlying facial affect recognition deficits is needed in order to explicate the modifiability of this impairment.

Building on these findings, chapter three presented a new study investigating facial affect recognition abilities of IPV offenders relative to non-IPV violent offenders and to non-offending controls. It explored the role of eye-scan paths as a potential mechanism underpinning recognition deficits in violent samples. This emerged as a key mechanism to be explored on the basis of research demonstrating a link between key pathologies characterising IPV and non-IPV violence and aberrant visual scanning behaviour when viewing emotional stimuli, coupled with research demonstrating the importance of attention to salient facial features in emotion categorisation. Specifically, the study explored: (1) whether recognition accuracy differs between participant groups; (2) whether groups differ in

attention allocated to the eyes and mouth of facial features; and (3) the influence of psychopathology on patterns of eye-scan paths and recognition accuracy (including anxiety, depression, borderline traits and psychopathic traits). Facial affect processing variables were assessed in the viewing of male and female stimuli depicting the six basic emotional expressions at 55% and 90% intensity.

Group differences did not emerge for recognition accuracy across expression type, intensity, or sex, but analyses did reveal group differences in eye-scan paths according to intensity and sex of the expression. With respect to expression intensity, IPV and non-IPV offenders tended to rely more on the mouths of expressions when emotional decoding was more difficult (55% intensity), relative to when it was easier (90% intensity), in comparison to non-offenders. With respect to expression sex, non-offenders made comparatively more fixations to the eyes of female expressions than to male expressions than did IPV and non-IPV offenders, who showed the opposite fixation pattern; and non-IPV offenders looked comparatively more at the mouths of female expressions than did non-offenders. Contrary to predictions, the analyses did not find convincing evidence for eye-scan paths being related to psychopathology. This may have been due to suppressor effects arising from studying emotion collapsed across expression type and/or co-morbidity of psychopathology within the sample. In particular, it is possible that an intricate pattern of relationships between psychopathology and eye-scan paths exists depending on the nature of the expression (i.e., type, sex, and intensity), psychopathological profile of the individual, as well as processing requirements of the task (e.g., presentation time and emotion categorisation versus free-viewing). It is also possible that eye-scan paths are influenced by personality variables which were not measured. As such, caution is warranted in concluding that psychopathology does not play a role in abnormal eye-scan paths seen in IPV and non-IPV offenders.

The failure of the study to replicate well-documented findings in relation to recognition accuracy among violent offenders is thought to be largely attributable to the characteristics of the non-offending control group, which demonstrated a similar level of psychopathic traits to offenders. However, the measurement of psychopathy also came into question since not only were levels of psychopathy high in non-offenders but an unexpected relationship between psychopathy and increased attention to the eyes of facial features was observed, albeit not significantly so. This raised questions about the validity of the three-factor scale of the LSRP in non-offending samples, something which was previously identified as an issue by Salekin et al. (2014).

Although the study did not find direct support for the role of aberrant eye-scan paths underpinning recognition deficits, it did not refute this proposal either since offender groups did demonstrate divergent patterns of visual scanning behaviour relative to those seen in non-offending controls. Nonetheless, the impact of such attentional-biases, as well as the mechanisms driving these, call for further investigation. It is possible, for example, that the eye-scan paths observed would lead to deficits in recognition of dynamic facial expressions, or when recognition abilities are further compromised by intoxication or heightened arousal (Clements & Schumacher, 2010; Tashiro & Frazier, 2007).

The totality of findings suggests that facial affect processing in IPV prisoners is best understood within the context of general violence since IPV and non-IPV offenders do not seem to differ across measures of recognition accuracy, eye-scan paths, or psychopathology related to facial affect processing. Three general points are important to note in relation to this tentative finding. First, there were fine-grained differences between IPV and non-IPV offenders, indexed by their demonstrating different patterns of impairment relative to non-offending controls. In particular, the eye-scan paths of non-IPV violent offenders were most different to non-offenders, while the pathological profile of IPV offenders was most different

to non-offenders. Second, there existed considerable overlap between the two offender groups in their antisocial trajectories, with three in four of the IPV offenders demonstrating a wider criminal history. It is important to emphasise that this overlap in offending history is seemingly representative of prison samples of IPV perpetrators (e.g., Herrero et al., 2016); however, further research using a specific sample of IPV-only prisoners would help to elucidate to what extent the similarity observed was due to an over-representation of generally-violent IPV perpetrators. Third, an important shortcoming of the study was that it did not offer insights into whether IPV offenders process the facial expressions of their partners' differently to other violent offenders. This is particularly important given that studies have found specific impairments in the recognition of wives' thoughts and feelings among IPV offenders relative to controls (Clements et al, 2007; Marshall & Holtzworth-Munroe, 2010).

Chapter four reviewed the psychometric properties of the CTS2 (Straus et al., 1996), a widely used measure of IPV, designed to assess the overt tactics used by respondents in the context of conflict within an intimate relationship. The purpose of review was to examine the strengths and limitations of the measure in order to understand how this might impact upon the findings drawn from many of the studies referenced in this thesis. The CTS2 was also adapted for use as a screening tool in the research study, and hence the strength of its emergent properties has implications for the appropriate classification of offenders as IPV and non-IPV violent in the study.

The CTS2 is renowned for its ease of administration in obtaining information pertaining to the prevalence of IPV. Its strengths include that it provides an objective measure of IPV and, as such, is minimally affected by cognitive distortions, denial, or minimisation (e.g., Straus et al., 2003). However, its objective-nature also relates to its major limitation. The measure been criticised for failing to take into consideration the context in which the

behaviour occurred, such as whether this was in the context of "play", and, as such, can inflate prevalence rates. Although Straus and colleagues have argued that the CTS2 does provide context through its specification of "during an argument" in the measure's instructions, an emanating issue is its failure to capture IPV occurring outside of conflict, such as that used in efforts to control a partner. Scholars have argued that IPV resulting from escalating conflict is a different phenomenon to IPV perpetrated to control a partner (e.g., Johnson et al., 1995). Consequently, IPV samples identified using the CTS2 may not adequately represent controlling abusers (or "intimate terrorists"). Other factors threatening the construct validity of the CTS2 include that, as standard, it assesses conflict tactics employed in the last 12 months and only in the current relationship, which assumes heterogeneity in behaviour across both time and relationships (Kimmel, 2002; Lehrner & Allen, 2014), and could underestimate true rates of IPV.

The aforementioned shortcomings of the CTS2 were ameliorated in its use as a screening tool in the research study since participants were instructed to indicate whether they had 'ever' perpetrated the acts as a teenager or adult. The acts were introduced as emanating from times when individuals 'disagree, get annoyed, have fights or just harm others for some reason'. As such, the context of harm should have excluded acts occurring in the context of 'play'. While the measure relied on respondent honesty, the instructions given served to normalise the behaviours in order to enhance truthful responding, and participants were reassured that the information would not be identifiable or passed on to authorities. Finally, although issues with fallible memory remain, the use of conviction data assisted in corroborating self-report.

Conclusions and recommendations

The work contained in this thesis focused specifically on facial affect recognition in violent offenders due to its central role in social communication and its implications for achieving empathy. Although empathy is not a monolithic phenomenon (Blair, 2008), and its respective components are influenced by a myriad of factors which this thesis did not examine (including alcohol use [Romero-Martínez, Lila, Martínez et al., 2016], arousal levels [Tashiro & Frazier, 2007], relationship to victim [Marshall & Marshall, 2011], attributes of the victim [Cohen et al., 2015], socioeconomic status and intelligence [e.g., Jolliffe & Farrington, 2004]), accurate emotion recognition is widely acknowledged as a necessary precursor to its attainment.

Overall, the work presented in this thesis suggests that, in addition to IPV offenders having deficits in recognising and regulating their own emotions (Gratz, Paulson, Jakupcak & Tull, 2009; Gratz & Roemer, 2004; Harper, Austin, Cercone & Arias, 2005; McNulty & Hellmuth, 2008), they also have problems in recognising others' emotions. Decoding inadequacies and inaccuracies are likely to be both contributors to and consequences of emotional distress commonly characterising IPV perpetrators and could render the individual vulnerable to escalating to violence during conflict (Cohen et al., 2015).

While there is evidence to suggest that some recognition deficits may be partner-specific (Marshall & Holtzworth-Munroe, 2010), there is also evidence indicating that IPV perpetrators have impairments in recognising strangers' expressions, similar to that seen in non-IPV violent offenders. Unfortunately, the nature of facial affect recognition deficits in IPV perpetrators remains poorly understood. In addition to there being a dearth of research, methodological variation precludes coherent synthesis of study findings. The work presented in this thesis indicates that more research is needed to elucidate the facial affect recognition

deficits seen in IPV perpetrators, including IPV prisoners, and underscores the value in comparing deficits to those seen in other violent offenders.

Implications for practice

The treatment of IPV offenders is heavily influenced by ideology rather than empirical evidence (Dixon, Archer, Graham-Kevan, 2011; Kevan-Graham, 2007). Instead of restricting the theoretical underpinnings of IPV treatment, evidence of a considerable overlap in IPV and non-IPV violence suggests the value in incorporating treatment components designed for general violence (Fagan & Browne, 1994; Klevens et al., 2012; Piquero et al., 2014). Adding to the evidence base, the findings of the current thesis underscore the value of incorporating emotional components into IPV treatment through highlighting abnormal processing of others' emotion which could put the individual at risk of inappropriate emotional and behavioural responding (Klinnert, Campos, Sorce, Emde & Svejda, 1983; Marshall et al., 1995). The findings provide little empirical justification for this component being tailored to IPV distinct from non-IPV violent offenders. However, a number of areas merit further investigation in order to instil confidence in this proposal (as discussed below).

Irrespective of further research, the findings add to the evidence base suggesting the potential efficacy of treatment targeting shared criminogenic needs as standard, followed by specialist intervention targeting IPV-specific risk factors; which could include, if necessary, promoting accurate recognition of partner-specific affective displays. While the size of such a change to long-standing practice is acknowledged, the surmounting evidence is that current treatment attempts for IPV are inadequate. It is hoped that the work presented in this thesis encourages treatment providers to depart from the resource-intensive IPV/non-IPV distinction founded on empirically-lacking principles and, instead, welcome the considerable

similarity between IPV and non-IPV violent prisoners in order to devise more efficient treatment strategies.

Historically, empathy training for violent offenders has been met with mixed success (see Day et al., 2010). It is suggested that a problem may lie at the level that treatment is targeted. In particular, interventions have typically focused on fostering empathic concern for victims (such as through victim statements or initiatives such as restorative justice); (i.e., stage three of Marshall et al.'s 1995 model; emotional replication). Yet the work contained within this thesis suggests that violent offenders demonstrate deficiencies at a very basic level of emotional encoding (i.e., stage one, emotion recognition), which could impede their ability to achieve empathy in *in vivo* interactions. While the offender may be able to conjure up empathic concern for a victim with guidance from treatment providers and additional contextual information to compensate for inefficiencies in emotional decoding, this would likely be context-specific and thus not transferrable to novel situations. In the community, difficulty reading emotion from facial expressions could impact upon the offender's ability to recognise emotional cues in the first place, and thus prevent effective regulation of emotional and behavioural responding in response to this information. As such, the work presented underscores a need for victim empathy modules being designed to parallel the sequential steps of empathy (i.e., repairing emotion recognition first, see Marshall et al., 1995) in attempts to effectively unravel cascading deficits in responding.

In terms of enhancing facial affect recognition, the work presented in this thesis provides support for proposals that there may be generalised deficits in visual attention rather than impaired recognition of the emotional category per se (e.g., Dadds et al., 2006). Specifically, it presented evidence indicating that violent offenders' allocation of attention to facial features differs as a function of the intensity and gender of the expression relative to non-offenders, but not the emotion. The findings therefore suggest that training methods

focusing on visual strategy, rather than the learning of expression-specific facial information, could provide the most efficient means of improving overall recognition and, ostensibly, in generalising benefits derived from treatment to novel expressions.

More specifically, initiatives in which violent offenders are encouraged, either implicitly or explicitly, to attend to the eyes of expressions of low intensity and female expressions may help to ameliorate problems in emotion recognition. Critically, attending to the eyes of facial expressions is particularly important for fear recognition (e.g., Schyns et al., 2007; 2009) and the ability to recognise the distress caused by one's behaviour is believed to be a deterrent of harmful behaviour (Blair, 2001). Of course, given the complexity of IPV and the operating of risk factors along many levels (Dutton, 2006), such approaches will need to be one of many (Marshall & Holtzworth-Munroe, 2010).

Recommendations for future research

A number of areas of further work have been identified throughout this thesis. First, the impact of psychopathology on facial affect processing in violent samples remains unclear. Further research examining a broad range of personality variables implicated in violent offending, as well as examining the influence of such personality pathology on attention to the facial features as a function of expression type, sex and intensity is warranted before it can be concluded that abnormal eye-scan paths are unrelated to psychopathology. Similarly, the way in which visual scanning behaviour may impact upon facial affect recognition accuracy remains elusive. Further research where violent offenders are compared to a control group without high levels of psychopathic traits would help to clarify the role of visual attention as a mechanism driving recognition impairment in violent samples. Such research would afford valuable insights into the most efficacious techniques for bringing about training-related improvements in emotion recognition. Moreover, future research using

longitudinal designs will be important to assess the capacity of training initiatives in bringing about sustainable behaviour change (Hubble et al., 2015).

More work is doubtlessly needed to develop an evidence-base of what works in the treatment of IPV and, crucially, for this to be successfully embedded into practice. The conclusions drawn from this thesis suggest that a gendered-approach to IPV research is at risk of providing only a limited understanding of IPV and provide support for the adoption of a violence-perspective. To fully explicate the extent of the similarities in the nature and etiology of these forms of violence it will be important for research to compare samples of IPV offenders with violent offenders with male and with female victims across constellations of risk factors operating at multiple levels of the social ecology (Dutton, 2006; Heise, 2012). With respect to facial affect processing, a logical extension would be to compare these participant groups using stranger and partner expressions. Such investigations would help to clarify the nature of recognition deficits and their role in IPV, over violent behaviour more generally.

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Appendices

Appendix I
Details of database search terms for systematic review

PsycINFO (OVID) 1976 to May Week 1 2016

1	Face perception/ or facial expressions/	16068
2	Facial affect recognition.mp.	279
3	Emotion recognition.mp.	2673
4	Emotion processing.mp.	1533
5	Facial affect processing.mp.	62
6	Emotional displays.mp.	272
7	Facial affect decoding.mp.	5
8	Emotion categorization.mp.	5
9	Emotion discrimination.mp.	176
10	Social cognition/	110068
11	Social affective processing.mp.	2
12	Violence/or domestic violence/ or intimate partner violence/ or violent crime/	39547
13	Perpetrators/ or criminals/	16421
14	Exp Prisoners/ or offender.mp.	18967
15	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11	29253
16	12 OR 13 OR 14	66906
17	15 AND 16	289
18	Remove duplicates from 17	289

Embase (OVID) 1974 to May 6 2016

1	Face perception/ or facial expressions/	90
2	Facial affect recognition.mp.	321
3	Emotion recognition.mp.	2404
4	Emotion processing.mp.	2138
5	Facial affect processing.mp.	82
6	Emotional displays.mp.	89
7	Facial affect decoding.mp.	1
8	Emotion categorization.mp.	6
9	Emotion discrimination.mp.	159
10	Social cognition/	3713
11	Social affective processing.mp.	4
12	Violence/or domestic violence/ or intimate partner violence/ or violent crime/	46988
13	Perpetrators/ or criminals/	8782
14	Exp Prisoners/ or offender.mp.	25065
15	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11	7998
16	12 OR 13 OR 14	68891
17	15 AND 16	101
18	Remove duplicates from 17	100

1	Face perception/ or facial expressions/	10465
2	Facial affect recognition.mp.	181
3	Emotion recognition.mp.	1296
4	Emotion processing.mp.	1162
5	Facial affect processing.mp.	57
6	Emotional displays.mp.	70
7	Facial affect decoding.mp.	1
8	Emotion categorization.mp.	4
9	Emotion discrimination.mp.	111
10	Social cognition/	0
11	Social affective processing.mp.	3
12	Violence/or domestic violence/ or intimate partner violence/ or violent crime/	31520
13	Perpetrators/ or criminals/	3190
14	Exp Prisoners/ or offender.mp.	16042
15	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11	11804
16	12 OR 13 OR 14	48336
17	15 AND 16	72
18	Remove duplicates from 17	70

Appendix II

Pro forma used for systematic review

GENERAL INFORMATION	
Title of article	
Author(s)	
Citation	
Type of publication and country of origin	
STUDY CHARACTERISTICS	
Study aim(s)	
Design	
Inclusion criteria	
Exclusion criteria	
Recruitment procedures	
PARTICIPANT CHARACTERISTICS	
Number of participants	
Type/definition of violent offender	

Comparator group(s)	
Demographical information (including age, education, ethnicity)	
Other (such as psychiatric diagnoses)	
FACIAL AFFECT RECOGNITION TASK	
Emotions studied	
How were stimuli developed?	
Nature of stimuli (including number, gender, intensity)	
Delivery of stimuli (including duration of presentation, number of trials, ordering)	
Response format (including time allocated, presence of stimuli during response, options available)	
Outcome measured (sensitivity, accuracy, response bias)	
RESULTS	
Groups compared	
Analyses carried out	
How was/were outcome(s) operationalised?	

Magnitude and direction of results	
Mean difference, p-value, effect size	
Confounding variables adjustment	
Limitations	
OTHER	

Appendix III

Quality assessment form

Quality Assessment Form				
Questions	Y 2	P 1	N 0	Comments
STUDY DESIGN				
Were the aims clearly stated?				
Was an appropriate method used to address the research aims?				
SELECTION & SAMPLING BIAS				
Does the paper explain how participants were recruited?				
Was a sample representative of the target population used? *(did the paper specify inclusion/exclusion criteria)*				
Did the paper clearly explain how 'violent' offender (and, if applicable, 'non-violent offender') was operationalised?				
Is demographic information reported?				
Is information pertaining to psychopathology reported?				
Was an adequate sample size used?				
PERFORMANCE BIAS				
Was there reference made to treatment status?				
MEASUREMENT BIAS				
Were stimuli known to be valid for outcome of interest?				

Is enough information provided on delivery of stimuli? *(i.e., presentation time, ordering of presentation, number of trials)*				
Is detail provided pertaining to the measurement of responses? *(e.g., free response format, time allocated, whether stimuli remained on screen etc.)*				
RESULTS/ ANALYSIS				
Was a power analysis conducted?				
Is calculation of outcome of interest explained?				
Are the statistical methods appropriate for analysing differences between groups?				
Were between-group differences in recognition for specific emotions explored?				
Were efforts made to control for important confounding variables?				
Have results been reported in sufficient detail?				
Were limitations identified?				

Overall Score	**/40**	**%**
Study Design	/2	%
Sampling	/7	%
Measurement	/4	%
Results	/7	%

Full-text papers that did not satisfy inclusion criteria for systematic review

Author(s) & Date	Title of Paper	Reason(s) for Exclusion
Baskin-Sommers & Newman (2014)	Psychopathic and externalizing offenders display dissociable dysfunctions when responding to facial affect	No measure of recognition or response bias Lack of information pertaining to nature of offending
Bueso-Izquierdo, Hidalgo-Ruzzante, Burneo-Gacés & Pérez-García (2015)	Emotional processing in batterers as assessed by Ekman Facial Expressions and Emotional Stroop Task in intimate partner violence situations	Spanish paper
Casey, Rogers & Yiend (2013)	Emotion regulation in psychopathy	No measure of facial affect processing
Gardner, Moore & Dettore (2014)	The relationship between anger, child maltreatment and emotion regulation difficulties in intimate partner and non-intimate partner violent offenders	No measure of facial affect processing
Gery, Miljkovitch, Berthoz & Soussignan (2009)	Empathy and recognition of facial expressions of emotion in sex offenders, non-sex offenders and normal controls	Did not include a group of non-sexual violent offenders
Gillespie, Mitchell, Satherley, Beech & Rotshein (2015)	Relations of distinct psychopathic personality traits with anxiety and fear: Findings from offenders and non-offenders	Violent offenders were not compared to a control group on emotion recognition task
Hastings, Tangney & Stuewig (2008)	Psychopathy and identification of facial expressions of emotion	No information pertaining to nature of offending

Author(s) & Date	Title of Paper	Reason(s) for Exclusion
Hudson et al. (1993)	Emotion recognition skills of sex offenders	Quality score did not meet that deemed acceptable for review
Kret & de Gelder (2013)	When a smile becomes a fist: The perception of facial and bodily expressions of emotion in violent offenders	Stimuli contained body posture
Lim, Day & Casey (2011)	Social cognitive processing in violent male offenders	Participants presented with video scenario, therefore additional contextual information
Munro et al. (2007)	ERN varies with degree of psychopathy in an emotion discrimination task	Psychiatric patients
Oliver, Watson, Gannon & Beech (2009)	The effect of sexual priming cues on emotion recognition in nonviolent child sexual abusers	Did not compare to a violent sample
Suchy, Rau, Whittaker, Eastvold & Strassberg (2009)	Facial affect recognition as a predictor of performance on a reading comprehension test among criminal sex offenders	No comparison to non-sexual violent offenders
Suchy, Whittaker, Strassberg & Eastvold (2009)	Facial and prosodic affect recognition among pedophilic and nonpedophilic criminal child molesters	Did not include a non-sexual violent group
Sygel, Kristiansoon,	Reactions on display/intimate partner violence – A study of a new interactive	Assessed interpretation of emotion in simulated situation

Full text requested but could not obtain for review – Retz-Junginger, Maurer, Rosler & Wolfgang Retz (2014). Deficits in facial expression recognition in reactive and proactive violent offenders, *Verhaltenstherapie und Verhaltensmedizin, 35*(2), 129-140.

Emotion Recognition in Offenders
Would you like to take part in research?

### What is the research on?

The research is looking at attention and emotion in individuals who have committed a violent offence.

What will I have to do?

The research will involve completing two tasks on the computer.
In the first task you will be asked to view faces and to identify facial expressions.
In the second task you will sometimes be asked to look away and sometimes towards a picture.
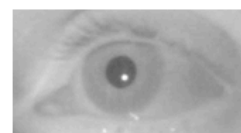
During these tasks an eye tracking device will be used to measure your eye movements, which allows us to measure visual attention. We will look at how your performance in these tasks is related to levels of anxiety and the ways in which you interact with others. You will also be asked to complete some questionnaires.

How long will it take?

No longer than 1 hour and 30 minutes.

What are the benefits for me?

You will gain an understanding about how easy or hard you find it to recognise different facial expressions of emotion, and how well you were able to control your own eye movements.

Yes, I would like to take part ☐

No, I would not like to take part ☐

Thank you

Harriet Chapman (Researcher)

(Please note that taking part in this study will have no impact on your treatment status or progression through treatment. Participation will also have no bearing on the progress of your sentence or future parole applications).

Appendix VI
Participant Information Sheets

UNIVERSITY^{OF}
BIRMINGHAM

CONSENT TO PARTICIPATE IN RESEARCH
School of Psychology, University of Birmingham

Attention and emotion in violent offenders

What is the purpose of this study?
The purpose of this study is to examine attention and emotion among participants who have committed a violent offence. You will be asked to take part in two tasks that will involve judging the emotions from faces and shifting attention toward and away from emotional stimuli. During these tasks, we will use an eye tracking device that will tell us where you are looking and when you are looking there, and how quickly your eyes are moving. This will allow us to measure visual attention. We will also look at how your performance in these tasks is related to levels of anxiety and the ways in which you interact with other people around you.

What does this study involve?
Your participation in this study will involve completing two computer based tasks which will ask you to view emotional facial expressions and identify letters quickly and accurately. During two of the three tasks we will use an eye tracker to measure your eye movements. You will also be asked to complete a number of questionnaires. Participation will last no longer than 1 hour 30 minutes.

Other important issues to be aware of:
  • Benefits from participation: You will gain insight in to how easy or hard you find it to recognise different facial expressions of emotion, and how well you were able to control your own eye movements.

Please note that taking part in this study will have no impact on your treatment status or progression through treatment. Participation will also have no bearing on the progress of your sentence or future parole applications.

  • Risks associated with participation: During participation in this study, you will encounter no greater risks of discomfort than those incurred in routine daily activities.

  • Withdrawal from the study: You may choose to stop your participation in this study at any time. Your decision to stop your participation will have no effect on your treatment or sentence progress. You may also choose to withdraw your data after you have completed the study. *If you wish to withdraw your data from the study, you must alert the researcher within **two weeks** of data collection to ensure that your data has not already been analysed.*

  • Data collection: The data collected in this study will include the responses that you make on the computer based tasks, data on your eye movements, questionnaire responses, and basic demographic information about you (e.g., sex, ethnicity, age, offence type, offence history). The data collected in this study will be used only for the purpose described in this form, and will be available only to the principal investigator listed in this consent form and other personnel involved in this study at the University of Birmingham.

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- Data gathered from this study will be maintained as long as required by regulations, which is up to 10 years following the publication of empirical articles or communications describing the results of the study.

- Confidentiality: Every effort will be taken to protect the names of the participants in this study. Your identity will only be recorded on your consent form and will not be recorded as part of your data. Your consent form will not be stored together with your data. Your data will only contain an ID number. The researchers involved in this study will not be able to match your ID Number to your identity. Your identity will not be revealed in any publication that may result from this study. All information you provide will be kept confidential, except as governed by law.

    - Please note that should you disclose any new information about a victim or potential victim, or an as yet unknown offence, then the researcher will have to report this information. The researcher also has a duty to notify the prison of any issues breaching prison rules.

<u>Researchers</u>

Harriet Chapman
Doctorate in Forensic Psychology
School of Psychology, University of Birmingham
▆▆▆▆▆
▆▆▆▆▆▆

Dr Steven M Gillespie
Postdoctoral Research Fellow
School of Psychology, University of Birmingham
▆▆▆▆▆
▆▆▆▆▆▆▆

CONSENT

☐   I have read the information about **"Attention and emotion in violent offenders"** and have been given an opportunity to ask questions.

☐   I understand that all data will remain confidential and will only be seen by members of the research team at the University of Birmingham.

☐   I understand that should I disclose any new information about an offence or victim/potential victim, the researcher will have to report this information.

☐   I confirm that the researcher may be provided access to details about me, including my age, and details about my offence and offense history.

☐   I understand that I must contact the researcher within two weeks if I wish to withdraw my data

☐   I agree to participate in this study.

Participant Name   **Participant Signature and Date**

....

Researcher Name   **Researcher Signature and Date**

....

Debrief Form

Attention and emotion in violent offenders

Facial expressions serve to communicate a person's feelings to those around them. They can tell us if another person is sad at something that we have sad, angry at something we have done, or scared by something which we are asking them to do.

The degree to which we can recognise different emotional expressions may be related to the ways in which we allocate attention to specific parts of the face. However, facial expressions and other images (e.g. snakes, sharks) may also disrupt our attention while we carry out tasks. These processes may be related to a number of personality variables, including how anxious we feel in social situations, and the ways in which we interact with other people.
Furthermore, we believe that these processes may be linked in different ways to different types of offending.

The tasks that you have completed today will allow us to look at how different aspects of personality affect the ways in which attention and emotion are linked with offending behaviours.

Please return this debriefing sheet to the researcher. If you have any questions about the study the researcher would be happy to answer them now.

Finally, please do not discuss your participation in today's session with anyone else who might participate in future.

Information sheet

What was the research looking at?
This research was interested in attention and emotion among violent offenders, and whether those who have been violent towards and intimate partner show different patterns of performance to violent offenders who have not committed domestic violence.

What are the predictions?
We predict that any differences seen between the two groups will be linked to different personality characteristics of the groups, e.g. different levels of anxiety and antisocial personality.

Why is this important?
The research findings could have important implications for the way in which violent offenders are treated in treatment programmes, and could help to better understand the drives to violently offend.

What next?
A report detailing what the research found will be made available to you within six months.