Emotion Recognition and Perceived Social Support in Young People who Offend

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Abstract

Young people who offend (YPwO) appear stuck in a cycle of adverse experiences, low social support and emotional skill deficits, yet their needs have not been extensively researched. The current study aimed to develop an understanding of alexithymia, the ability to recognise others' emotions and perceived social support in YPwO and to explore the relationships between these variables.

Fifty YPwO were recruited through three Youth Offending Teams and fifty age, gender, ethnicity, socio-economic status and academically-matched young people without a known offending history were recruited from a college and youth service in the same geographical area. All participants completed a demographic questionnaire, the Toronto Alexithymia Scale, a Facial Emotion Recognition Task, a Verbal Emotional Prosody Recognition Task and the Multidimensional Scale of Perceived Social Support.

Statistical analyses failed to show that, relative to the control group, YPwO had higher levels of alexithymia, lower levels of perceived social support or lower ability to recognise others' emotions. However, relative to the control group, YPwO did show significantly lower ability to recognise fear through verbal prosody. Of interest, children who had been 'looked after', rather than those with offending status in isolation, were found to show significant difficulties in identifying and describing feelings, ability to recognise others' emotions and reported lower levels of perceived social support, particularly from family. In addition, significant correlations were found between i) alexithymia and perceived social support, ii) the ability to recognise others' emotions and perceived social support, and iii) the ability to recognise emotions from facial expressions and the ability to recognise emotions through verbal prosody.

The current study supports the view that offending behaviour is the result of a complex interplay of individual, developmental, and social factors. Theoretical and clinical implications of the study findings are discussed and potential areas for future research are suggested.

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CHAPTER ONE: INTRODUCTION

1.1 Study overview

A recent joint publication by the Welsh Government (WG) and the Youth Justice Board (YJB) (WG/YJB, 2014) includes little information about emotional and psychological needs for young people who offend (YPwO). Moreover, the Criminal Justice System in the UK is heavily based on the use of deterrence and restorative justice. For example, many interventions for YPwO are focussed on anger management and victim sympathy. These approaches assume that YPwO are able to recognise and express emotions, but there is evidence to suggest that YPwO display difficulties in the ability to recognise and label their own and others' emotions.

Identifying predictors of offending behaviour might help to better inform future policy and guidance and target psychological interventions to reduce the risk of offending and re-offending. The current study aims to build on the understanding of emotion recognition and social support difficulties experienced by adolescent YPwO. In particular, it explores the way in which the ability to recognise emotions in oneself and others, and perceived levels of social support, may differ between a group of YPwO and a comparison group with no reported offending history. This study also explores the interrelationship between these phenomena in young people. Implications will be discussed in relation to clinical practice and theoretical understanding for the population of YPwO.

This thesis consists of four chapters:
Chapter One: The Introduction provides a critical overview of current theory and research relating to offending behaviour, emotion recognition and social support, based on a review of the literature (see Appendix A for details of search terms and databases used). This is followed by a systematic review of studies exploring the relationship between emotion recognition and offending behaviour, and a rationale for the current study.
Chapter 2: The Methodology chapter describes the design, materials, procedures, participants and data analysis used in the current study.
Chapter 3: The Results chapter presents the results of the descriptive and inferential statistical analysis of the data collected.
Chapter 4: The Discussion chapter concludes the thesis with a summary of the results, study strengths and limitations, research recommendations and theoretical and clinical implications.

1.2 Young People who Offend

1.2.1 Definition of young people who offend

In England and Wales, YPwO aged 10-17 are managed by youth courts, given different sentences than adults and sent to special secure centres for young people. YPwO aged 18-25 are treated as adults by the law, but if they are served a prison sentence, they will attend prison for 18 to 25-year-olds, rather than a full adult prison (Direct Gov., 2015). The offending sample recruited in this study includes young people aged 14-18 years currently supported by a Youth Offending Team (YOT), because they have engaged in offending behaviour (an act proscribed by law (Prior & Paris, 2005)). This study will use the term 'young people who offend' (YPwO) rather than 'young offenders', to emphasise YPwO are young people first and offenders second (WG, 2014).

1.2.2 Development of offending behaviour

One of the most widely cited theories of the development of offending behaviour is the taxonomic theory (Moffitt, 1993). Incorporating the developmental life-course theory (Salvatore & Markowitz, 2014), Moffitt suggests that offending causes and courses can be categorised into two groups: (i) the life-course persistent group, who have experienced high levels of childhood adversity and present with high levels of aggression from childhood, and (ii) the adolescence-limited group, who have had relatively stable backgrounds and, present with relatively non-aggressive behaviours from adolescence, in an attempt to cope with emerging adulthood (due to peer pressure and wishing to be treated like adults). In support of this theory, different risk factors correlate with different levels of offending (van der Laan *et al.* 2010) and individuals who present with behaviour problems earlier in life are reported to develop more persistent violent offending behaviour (Cote *et al.* 2007). However, the taxonomic theory has been critiqued with reports that both early-onset and adolescent-onset offending behaviours are associated with atypical alterations in brain structure and functioning, cortisol secretion and personality traits, which are rarely limited to the adolescent period (Fairchild *et al.* 2013). Despite disagreement regarding the development of different offending presentations, theory and research confirms that the risk of offending is statistically more likely if exposed to certain biopsychosocial factors (Loeber *et al.* 2008, 2009). What follows is a summary of the interaction and non-linear nature of these risk factors, framed within Dodge & Pettit's (2003) developmental biopsychosocial transactional model of conduct problems (see Figure 1.1).

1.2.2.1 *Attachments and relationships*

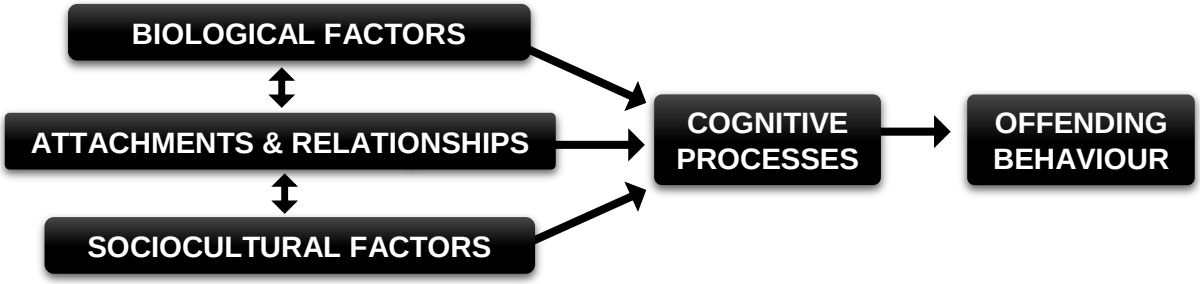
A child's attachment figure offers the context of their developmental trajectory (Ogilvie *et al.* 2014), whereby a positively responsive attachment figure helps a child to feel safe enough to

explore their environment and learn about themselves (their self-concept) and the social world (Shaw & Dallos, 2005), supporting healthy emotional, cognitive and physical development (Wallin, 2007). A child's attachment relationship is the template for all future behaviour and relationships (Rich, 2006; Shaw & Dallos, 2005). If a child repeatedly experiences, and subsequently learns, "if I cry, then I will be ignored", they are likely to feel unwanted and internalise this to believing that they are 'unwantable' (Bowlby, 1973; Shaw & Dallos, 2005); the child's emotional functioning is organised around their internal working models and beliefs (Mikulincer *et al.* 2003).

Attachment risk factors that have been associated with the development of offending behaviour include a harsh parenting style, lack of parental warmth, abuse and neglect, early inconsistent parenting, parental stress (Darker *et al.* 2008; Dodge & Pettit, 2003; Hoeve *et al.* 2009; Leschied *et al.* 2008; Sentse *et al.* 2009, 2010) and learnt attention seeking through bad behaviour (Farrington *et al.* 2012a). Research consistently reports that the majority of YPwO have histories of disrupted early attachments and loss (Casswell *et al.* 2012; Snodgrass & Preston, 2015), with 74% of YPwO having experienced family break-down (Chitsabesan *et al.* 2006) and 49% of YPwO in institutions having spent time in local authority or state care (Blades *et al.* 2011) and often having experienced high risk family backgrounds of deprivation, poor parenting, abuse and neglect (Biehal *et al.* 2010).

Negative interaction with peers has also been linked to the development of offending behaviour, including factors such as peer rejection (Sentse *et al.* 2010), bullying or being a victim of bullying (Farrington *et al.* 2012b) and mixing with anti-social peers groups (Laird *et al.* 2005; Monahan *et al.* 2009; Richardson & Budd, 2003).

Figure 1.1: Biopsychosocial model of offending behaviour (adapted from Dodge & Pettit, 2003)



1.2.2.2 *Biological risk factors*

Neurological, chemical and genetic biological risk factors which can affect cognitive processes and predispose offending behaviour, include temperament (such as impulsivity, poor self-control and risk-taking: Cauffman *et al.* 2005; Ferguson, 2010), cognitive

impairment (affecting verbal, spatial and executive functions: Assink *et al.* 2015; Manninen *et al.* 2013; McGloin & Pratt, 2003) and gender (Lahey *et al.* 2006; Vaske *et al.* 2011). Furthermore, genetic factors are reported to account for approximately 40%- 50% of variation in offending (Rhee & Waldman, 2002), with twin and adoptee studies reporting heritable anti-social and offending behaviour patterns (Beaver, 2011; Rhee & Waldman, 2002). It is unlikely that these biological factors operate in isolation and there is agreement that biological risk factors for offending behaviour influence and are influenced by environmental factors (Jaffee *et al.* 2005; Rutter & Silberg, 2002; Moffitt, 2005). For example, females are reported to have higher levels of chemicals called neuropeptides, which promote social bonding (Young *et al.* 2007), suggesting that females might be protected more than males from attachment- related risk factors associated with offending behaviour.

1.2.2.3 *Sociocultural risk factors:*

Sociocultural risk factors of offending behaviour are proposed to include school and neighbourhood characteristics (Loeber *et al.* 2008; Pauwels *et al.* 2015), perinatal substance misuse (Smith *et al.* 2015), low socio- economic status (income, education and occupation) (Bradley & Corwyn, 2002; Salvatore & Markowitz, 2014), educational experience (Salvatore & Markowitz, 2014; WG/YJB, 2014) and time in local authority (LA) care (Schofield, *et al.* 2015). Studies have also reported no impact of neighbourhood characteristics such as high community crime on offending (Assink *et al.* 2015; Pauwels *et al.* 2015), instead reporting effects for individual factors like drug and alcohol misuse (Assink *et al.* 2015; Richardson & Budd, 2003).

Findings of ethnic risk factor research are also mixed, with some reports of Black, Asian or mixed ethnic background being a risk factor (Haynie *et al.* 2008) and other reports of no significant links between ethnicity and offending (Assink *et al.* 2015). Disparity in findings might be attributable to mediating factors, such as integration difficulties or a sense of discrimination (Farrington *et al.* 2003).

1.2.2.4 *Cognitive processes*

Early life experiences can have lasting effects on brain architecture and cognitive processes involved in the regulation of emotion, cognition, behaviour and effective management of situations and relationships, with a child's brain laying the foundation of structures and neurological pathways in the first few years of life (Fox *et al.* 2010; Young & Carter, 2007; Young *et al.* 2007). Unfortunately, offending-related risk factors are highest during a child's first few years (Loeber *et al.* 2006, 2009). For example, perinatal substance misuse or early neurological impairment at birth are linked to frontal lobe and executive functioning deficits

(Assink *et al.* 2015; Smith *et al.* 2015), which have been linked to offending behaviour (Cauffman et al. 2005). Cognitive processing difficulties in verbal language and cognitive flexibility have also been related to offending behaviour (Manninen *et al.* 2013; McGloin & Pratt, 2003; Pihet *et al.* 2011).

The aforementioned factors, especially deprivation, poor parenting, abuse and neglect (Leschield *et al.* 2008) are also reported to predispose deficits in mentalisation (Fonagy *et al.* 2002), including facets of social cognition, emotional awareness and emotion regulation (Howe, 2005; Nehemiah *et al.* 1976) deficits which can risk ongoing emotional, social and behavioural difficulties, including offending behaviour (Koohsar & Bonab, 2011; Leschied *et al.* 2008; Schofield *et al.* 2015).

1.2.2.5 *Review of the risk factor approach*

In support of the risk factor approach, a recently Welsh published study of adverse childhood experience (ACE) reported that adults who had experienced four or more ACE's were fifteen times more likely to have committed a violent offence in the last year and twenty times more likely to have been incarcerated (Bellis *et al.,* 2015). Adding to the risk factor model of offending, a growing body of research proposes protective and promotive factors for reducing risk of offending (Loeber *et al.* 2009; Lösel & Bender 2003; Salvatore & Markowitz, 2014; Stouthamer-Loeber *et al.* 2002; van der Laan *et al.* 2010). These promotive factors are considered separate from, rather than the opposite of, risk factors (Stouthamer-Loeber *et al.* 2004; Loeber *et al.* 2008). It is suggested that the higher the number of risk factors a young person is exposed to and the lower their exposure to promotive factors, the greater the likelihood of offending behaviour (Stouthamer-Loeber *et al.* 2002). Whilst intuitive, this proposal is limited by its lack of consideration of intensity or severity of risk factors in predicting offending behaviour.

Furthermore, cross-study comparison and generalisability of risk/protective factor research is compromised with the majority of supporting research completed with males and participants with differences in ethnicity and offence patterns (Markowitz & Salvatore, 2012; van der Put *et al.* 2013). The risk factor approach has also been critiqued for raising theory-practice implementation issues, such as it leading to deficit-based service eligibility criteria and universal, rather than individualised, interventions (Goldson, 2005; Haines & Case, 2008).

1.2.3 Prevalence and demographics

Across England and Wales, 94,960 young people were arrested from April 2014 to March 2015, with 30,960 young people formally sentenced. Overall reoffending rates are reported

to be just under 40%, although 70% of young people released from custody are reported to re-offend within a year (Youth Justice Board (YJB), 2016).

Generally, research suggests that offending behaviour peaks during late adolescence and declines as one enters adulthood (Monahan *et al.* 2009; Piquero *et al.* 2002). In explanation, protective factors are thought to be lower during adolescence (Loeber *et al.* 2008, Van der Laan & Blom 2006), a developmental stage characterised by significant psychosocial changes affecting perception of oneself and others, interaction and expression of emotions (Blakemore, 2008; Yurgelun-Todd, 2007).

Relative to males, female offending behaviour peaks at a younger age, is less frequent, less severe and less violent (Becker & McCorkel, 2011; Fergusson & Horwood, 2002; Marcus, 2009). Gender differences are attributed to parents being less tolerant of female delinquency (Welford, 1990) and boys maturing later than girls (Moffitt *et al.* 2001). More recent research reports a narrowing of the offending gender gap, with males offending rates decreasing and female offending rates remaining stable (Fergusson, 2013).

Markowitz & Salvatore (2012) report a race-specific influence on patterns of offending, with African and non-African populations showing significantly different offending rates during different ages. Overall, significantly higher proportions of YPwO are from Black, Asian or other minority ethnic (BAME) groups (Chitsabesan *et al.* 2006; Haynie *et al.* 2008; YJB, 2016). In explanation, Moffitt (1994) reports that BAME young people spend more time in the maturity gap than young people of white ethnic background, because of delayed transitions to adult social roles. It has been suggested that ethnic differences in offending rates might also be related to economic and employment factors experienced by BAME groups (Haynie *et al.* 2008). Research has repeatedly demonstrated that low socio-economic status, as well as lower levels of education, are correlated with offending, especially violent offending (Farrington *et al.* 2012a; Laub & Sampson, 2003; Marcus, 2009). The correlation between delayed transitions to adulthood, economic risk, employment and offending appear particularly relevant in the current economic climate where jobs and house ownership are increasingly more difficult to achieve (Bäckman *et al.* 2014; Farrall *et al.* 2010).

In terms of factors more closely associated with the individual, studies completed with YPwO in England and Wales report that 20%-25% of YPwO have an IQ below 70, meeting the criteria for a learning disability, and a further 30% could be defined as having a borderline learning disability (Chitsabesan *et al.* 2006; Harrington *et al.* 2005). A third of YPwO worry about their mental health (Walsh *et al.* 2011) and around a third are considered to

experience mental health difficulties (Barrett *et al.* 2006; Chitsabesan *et al.* 2006). Of note, definitions of mental health problems differ between studies and self-reported difficulties are likely to be higher than for diagnosable disorders. For example, Anderson *et al.* (2004) reported that 44% of YPwO were likely to have mental health problems, but 76% indicated experience of emotional problems.

1.2.4 Service and policy context for YPwO

Considering the risk factors for offending, it is no surprise that YPwO have complex needs (Chitsabesan *et al.* 2006), which cost public services ten times more than meeting the needs of young people who do not offend (Scott *et al.* 2001). In 2009, YPwO cost the economy an estimated £8.5- £11 billion (National Audit Office, 2010).

Recent years have seen a strategic drive by the YJB to promote a better option for dealing with offending through placing greater emphasis on rehabilitation (Andrews & James, 2010) and addressing the causes of offending behaviour (WG/YJB, 2014). In 2008, the YJB updated the Key Elements of Effective Practice (YJB, 2008) (the 'what to do'), to complement Case Management Guidance for youth offending teams (the 'how to do'), and the revised National Standards for Youth Justice Services (YJB, 2013) (the 'must do'). More recently, the WG and YJB jointly published the Children and Young People First Strategy (WG/YJB, 2014), re-emphasising a commitment to accountable service delivery and effort to include equal access to services, young person involvement, preventative and multi-agency support, improved knowledge and skills of young people's needs and restorative justice.

Intensive social and behavioural skills preventative training is reported to support a positive developmental trajectory (Deković *et al.* 2011) and some positive evidence exists for intervention programmes reducing offending (Lösel, 2001; Prior & Paris, 2005). However, there is no evidence that preventative training prevents offending behaviour (Deković *et al.* 2011) and there is a lack of evidence about what intervention, provided by what profession, is effective for what type of offending behaviour in what setting (Lösel, 2001; Mason & Prior, 2008). Furthermore, YPwO indicate that their needs are being ignored and poorly met by professionals (Chitsabesan *et al.* 2006; Uservoice, 2011) and as a result, tend to have a negative view of professionals, especially social workers and the police (Uservoice, 2011). YPwO expressed the view that barriers related to issues of understanding, stigma and confidentiality, prevent accessing support (King *et al.* 2014; Walsh *et al.* 2011). Socio-cultural barriers to effective support are claimed to arise from the 'new youth justice system' (Goldson 2000), borne out of the Crime and Disorder Act 1998 (CDA, 1998). Critics argue that the new youth justice system has ruptured the relationship between *how* (processes, procedures and provisions) and *why* (philosophical and ethical goals) it deals with YPwO

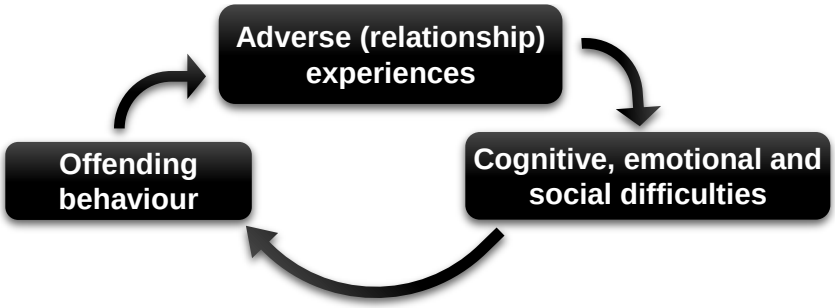
(Phoenix, 2016). The new system has introduced a system fixated on risk assessment, staffed by a de-professionalized staff, whose flexibility and professional judgement are limited by performance targets (Goshe, 2015; Phoenix, 2016; Smith, 2014). The 'new youth justice' has been criticised for being disproportionately politicised (Pitts, 2001; Smith, 2011), causing youth justice policy to be contradictory (Muncie, 2008) and dictated by politicians and populist demands of punishment (Cullen *et al.,* 2000). Phoenix (2016) argues that Youth Justice Governance, services and research are committed to this political punitive discourse and subsequently struggle to think about supporting YPwO in any other way.

The overarching penal framework also brings forth the fact that research and services for YPwO's emotional and psychological needs are often biologically driven and organised around psychiatric diagnosis (Preston *et al.* 2015). For example, a large body of forensic research is oriented around diagnostic labels such as psychopathy, conduct disorder and callous unemotional traits. This diagnostic system has been brought into question (Division of Clinical Psychology, 2013; Pilgrim, 2014), critiqued for having conceptual and empirical limitations (Frances, 2012),) and criticised for placing unethical emphasis on an individual requiring medical treatment for being 'dysfunctional', rather than experiencing a reaction of emotional distress in the context of biopsychosocial circumstances (Boyle, 2013; BPS, 2011; Conrad, 2007; Johnstone & Dallos, 2014).

1.2.5 Section summary and current study

Theory, research and discourse of the development, prevention and intervention of offending behaviour encourages one to think of offending behaviour as a product of adverse biopsychosocial experiences. Despite some promising interventions, YPwO predominately appear stuck in a vicious cycle of adverse (relationship) experiences, compromised cognitive, social and emotional development and offending behaviour; experiences met with further negative evaluations, resulting in a heightened awareness of negativity (see Figure 1.2). This highlights the need for research to inform interventions which have a lasting impact on the ability of YPwO to understand and to form healthy relationships and to function in daily life. Accordingly, the current study aims to build on previous research conducted with YPwO, measuring their emotion recognition ability and perceived levels of social support.

Figure 1.2: The proposed vicious cycle of experiences of YPwO



1.3 Emotion recognition

1.3.1 Definition and importance of emotional skills

Emotion recognition involves the discrimination, identification, interpretation and labelling of emotions (Bullock & Russell, 1984). Emotional skills are described as “the ability to monitor one's own and others’ emotions, to discriminate among them and to use the information to guide one's thinking and actions” (Salovey & Mayer, 1990, p.198), guiding us towards rewarding stimuli and away from threatening or unhelpful stimuli (Leahy *et al.* 2011). Emotional skills are therefore important to ensure adaptive functioning (Leahy *et al.* 2011; Salovey & Grewal, 2005), moderating the impact of negative life events (Leahy, *et al.* 2011) and predicting psychological and physical well-being (Bar-on & Parker, 2000; Schutte *et al.* 2002). Specifically, emotional skills support cognitive and social development (Denham, 2007), academic achievement (Goetz *et al.* 2005), career success (Van Rooy & Viswesvaran, 2004) and positive social connections with other people (Oately, 2004). A lowered ability to understand one’s own or others’ emotions, on the other hand, makes interpersonal communication problematic and increases the risk of social difficulties, including antisocial and impulsive behaviours associated with offending (Allen *et al.* 2008; Blair*,* 2005; Fonagy, 2003; Fossati *et al.* 2009).

1.3.2 Summary of the theoretical understanding of emotional skill development

The understanding of emotional skills development throughout childhood remains somewhat limited, particularly from childhood through to adolescence and adulthood (Grossmann & Johnson, 2007; Lawrence *et al.* 2015; Mancini *et al.* 2013). Broadly speaking, it is thought that brain regions responsible for emotional understanding develop through attachment relationships and experiences (Fox *et al.* 2010; Schore, 2001), indicative of a bi-directional and inseparable relationship between biological and psychosocial factors (Jorgensen *et al.* 2007).

Attachment theory describes how facial and vocal emotional expressions are the only communication methods a newborn baby has available. Their survival depends entirely on the caregivers’ ability to notice and respond to these expressions (Esposito *et al.* 2014). Responding to the babies’ observable signs of emotion by mirroring and linguistic labelling, (also known as attunement) commences emotional skill development (Hughes, 2006; Wallin, 2007). Prosodic and facial cues are thought to play a special role in this interaction and development. For example, parents shape the pitch of their speech to attract the babies’ attention and communicate emotional and practical information (Quam & Swingley, 2012). A child’s level of attraction to these paralinguistic cues affects their attention to objects,

subsequent exploration behaviour (Quam & Swingley, 2012) and emotional (as well as neurological, cognitive and physical) development (Parise *et al.* 2007; Wallin, 2007). Attachment theorists describe how impaired or underdeveloped emotion recognition skills can be associated with early attachment difficulties when children's internal states are not understood and labelled by others (Esposito *et al.* 2014; Fonagy *et al.* 2002; Fonagy & Luyten, 2009; Meins *et al.* 2002; Murray & Andrews, 2005; Wallin, 2007). The social constructivist model would add that learning and emotional skill development takes place within a social context, with factors such as socio-economic deprivation related to emotion recognition deficits (Herba & Phillips, 2004; Joukamaa *et al.* 2007; Kokkonen *et al.* 2001).

In addition to brain regions used for processing visual information from facial expressions (e.g. occipital areas, superior temporal and fusiform gyrus, Heberlein & Adolphs, 2007; Heberlein & Atkinson, 2009) and auditory information from prosody (e.g. Fujisawa & Shinohara, 2011), experiencing one's own and processing others' emotions are thought to broadly involve the same brain regions (Heberlein & Adolphs, 2007; Heberlein & Atkinson, 2009). Paralinguistic communication is primarily linked to right hemisphere processes, although bilateral brain damage studies suggest that the left hemisphere and subcortical structures are also required for effective emotion recognition (Everhart, 2006; Fine *et al.* 2009; Pell *et al.* 2006). As a child develops, their brain refines the connections between 'higher cortical' areas and subcortical structures responsible for emotion-processing (Herba & Phillips, 2004). There is evidence that ventral prefrontal, the anterior insula and the amygdala are particularly important regions for the identification and processing of emotion-related information from facial and vocal expressions (Adolphs, 2006; Calder *et al.* 2001; Mill *et al.* 2009; Lawrence *et al.* 2007; Ochsner, 2004; Phelps & LeDoux, 2005).

Supporting the above narrative, care leavers, for whom early secure attachments, positive experiences and healthy neurological development is at risk (Biehal *et al.* 2010; Fox *et al.* 2010), show higher levels of alexithymia and emotion recognition deficits (Barone & Lionetti, 2012; Hollingworth, 2014; Paull, 2013; Pears & Fisher, 2005). Of note, nearly half of YPwO in institutions have spent time in LA care (Blades *et al.* 2011) and the majority of YPwO are exposed to ACE's (Chitsabesan *et al.* 2006, WG/YJB, 2014).

In summary, existing research documents a link between nature, nurture, early experiences and emotional skills. A child's biological predisposition, nature of attachment, and environmental context shapes the parent-infant interaction, predicting the nature of exploration behaviour and subsequent brain architecture on which all future development is

built. Many YPwO experience difficult early life experiences, which, in light of the above research, are likely to have an adverse impact emotional skill development.

1.3.3 Alexithymia

The concept of alexithymia arose in psychosomatic practice in the 1960's (Nehemiah & Sifneos, 1970). Literally meaning "no words for feelings", alexithymia can be defined as "(i) difficulty identifying feelings and distinguishing between feelings and the bodily sensations of emotional arousal; (ii) difficulty describing feelings to other people; (iii) constricted imaginal processes, evidenced by a paucity of fantasies; and (iv) a stimulus-bound, externally oriented cognitive style" (Taylor *et al.* 1997, p.29). One may note that these defining factors are subject to some interpretation, which may contribute to the complexity of alexithymia research and academic and clinical discussion. For example, a review of the literature identified incongruence around whether alexithymia refers to no words for one's own feelings alone or no words for feeling of others too, the extent to which alexithymia includes emotion regulation difficulties, whether alexithymia should be conceptualised categorically or dimensionally, and whether alexithymia should be considered a fluctuating ability or personality trait (see later sections). Nevertheless, literature appears to be in agreement that alexithymia is a a cognitive processing deficit, rather than an experience of lower intensity emotions (Luminet *et al.* 2004).

1.3.3.1 *Alexithymia measures (see section 2.5.3 for further details)*

Initial alexithymia measures, such as the Schalling-Sifneos Personality Scales (Apfel & Sifneos, 1979) and the Minnesota Multiphasic Personality Inventory (Kleiger & Kinsman, 1980), lacked validity and reliability (Taylor *et al.* 2000). More commonly used measures include the self-report Toronto Alexithymia Scale (TAS-20; Bagby *et al.* 1994a, 1994b), the Bermond-Vorst Alexithymia Questionnaire (Vorst & Bermond, 2001), and the observer-rated Beth Israel Hospital Psychosomatic Questionnaire (BIQ; Sifneos, 1973).

The TAS-20 is the most widely used measure (Parker *et al.* 2010; Taylor & Bagby, 2004) and is considered robust (Karukivi *et al.* 2011; Säkkinen *et al.* 2007) and more reliable than the BIQ (Bagby *et al.* 1994a, 1994b). The TAS-20 provides an overall alexithymia score, as well as three inter-correlated subscale scores (higher scores indicating higher alexithymia): (i) difficulty identifying feelings (DIF; for example, not being able to identify physical sensations as signs of affective feelings or not being able to differentiate between different emotions), (ii) difficulty describing feelings (DDF; for example, not being able to find the right words to describe feelings and (iii) externally oriented thinking (EOT; for example, being more interested in factual events than the inner world of thoughts, feelings and subjective

interpretations of events). A multi-method approach to measuring alexithymia is recommended, especially with younger participants (Lichev *et al.* 2014; Lumley *et al.* 2005), because developing language and cognitive skills of younger populations are suggested to affect self-report quality (Borgers *et al.* 2000; Marsh *et al.* 2005) and self-report measures require insight in order to accurately report difficulties (Lane *et al.* 1997*;* Lundh *et al.* 2002). The TAS-20 is considered appropriate as a lone assessment where resources for observer assessments are unavailable (Taylor *et al.* 2000). Factorial validity of the TAS-20 in different languages and cultures have been reported (Taylor *et al.* 2003), psychometric properties have been confirmed with young people (Parker *et al.* 2010; Säkkinen *et al.* 2007, Zimmermann *et al.* 2007) and the measure has been successfully used with YPwO (Möller *et al.* 2014; Moriarty *et al.* 2001; Zimmermann, 2006).

1.3.3.2 *Alexithymia: Personality trait versus fluctuating ability*

Parker *et al.* (2008) described alexithymia as a stable personality trait, with a number of longitudinal studies demonstrating the relative stability (ranging from 6 months to 11 years) of TAS-20 scores amongst adults and adolescents (de Gucht, 2003; Karukivi *et al.* 2014; Saarijarvi *et al.* 2006; Tolmunen *et al.* 2011). However, the same authors still note a degree of fluctuation in various alexithymia subscale scores, affected by mood, so alexithymia might be most helpfully understood as a state that fluctuates across time depending on other variables (Honkalampi *et al.* 2000). The majority of alexithymia research remains cross-sectional in nature, so firm conclusions are difficult to make. Parker *et al.* (2008) suggest that alexithymia might be more stable if measured as a dimensional rather than categorical construct.

1.3.3.3 *Dimensional versus categorical conceptualisations of alexithymia*

It has been recommended that alexithymia be measured as a continuous variable (Cohen *et al.* 2003). However, Parker *et al.* (2008) concluded that alexithymia is best measured as a dimensional construct, with TAS-20 scores of ≥61 considered as high alexithymia, a score of ≤51 as low alexithymia and any scores of 52-60 representative of a ‘borderline’ group (Oskis *et al.* 2013; Taylor *et al.* 1997). With reference to the current study, cut-off scores for alexithymia, based on the TAS-20, have not yet been validated with adolescents, and research suggests that the use of adult cut-off scores might lead to false positive identification (Parker *et al.* 2010), as young adolescents often score higher on alexithymia measures than older adolescents and adults (see section 1.3.4.1). Cut-off scores will be reported for the current study to allow for cross- study comparison, but should be interpreted with caution.

1.3.4 Alexithymia and Demographic variables

1.3.4.1 *Alexithymia and age*

Using cut-off scores, clinically significant levels of alexithymia vary depending on age group, with older adult alexithymia prevalence figures higher than the 7.3% to 12.8% prevalence figures reported in the adult population (Honkalampi *et al.* 2000; Kokkonen *et al.* 2001; Mattila *et al.* 2006; Salminen *et al.* 1999). For example, alexithymia has been reported to range from 15% (Gunzelman *et al.* 2002) to 34% (Joukamaa *et al.* 1996) in older adult populations (older than 60 years of age), with differences in prevalence figures likely to be due to variation in the TAS subscales used to interpret findings (Gunzelman *et al.* (2002).

Adolescent and young adult studies have reported prevalence rates from 6.9% to 15.9%, depending on age and gender (Honkalampi *et al.* 2009; Joukamaa *et al.* 2007; Säkkinen *et al.* 2007). Alexithymia prevalence amongst younger populations is reported to be around 8% for a Finnish group of participants aged 17-21 years (Karukivi *et al.* 2010) and an Italian group of undergraduates (Montebarocci *et al.* 2004) and 9% for a group of young adults from a New Zealand population (Garisch & Wilson, 2010). An English study with a sample of 18-27 year old undergraduate students reports alexithymia rates of 17.9% (Mason *et al.* 2005) and a recent unpublished dissertation completed with a demographically diverse South Wales population aged 16-22 years, reported prevalence rates of 34.9% in their control group (Paull, 2013).

Alexithymia is thought to reduce with age from early to late adolescence (Meins, *et al.* 2008; Moriguchi *et al.* 2007; Oskis *et al.* 2013; Parker *et al.* 2010; Säkkinen *et al.* 2007; Zimmermann *et al.* 2007). In explanation, Lane & Garfield (2005) suggest that many young people are still developing cognitively and socially, improving their ability to recognise and communicate emotions as they enter adulthood. Conversely, some critics note that higher alexithymia amongst younger age groups can be attributed to the reading difficulty of the TAS-20 (Parker *et al.* 2010), which is further supported by studies reporting alexithymia to be significantly related to reading and verbal ability (Kokkonen *et al.* 2003; Way *et al.* 2007). Incorporating both suggestions, Säkkinen *et al.* (2007) suggest that children and young adolescents' increased difficulties in describing emotions are due to developmental stage and developing cognitive abilities.

1.3.4.2 *Alexithymia and gender*

In a review of 42 studies, adult men showed significantly higher levels of alexithymia than adult women (Levant *et al.* 2009). Specifically, alexithymia levels are reported to range between 9-17% for men and 5-10% for women (Honkalampi *et al.* 2000; Kokkonen *et al.*

2001; Mattila *et al.* 2006; Salminen *et al.* 1999), mostly due to men reporting higher scores on the TAS-DDF and TAS-EOT subscales (Mattila *et al.* 2006; Parker *et al.* 2003; Salminen *et al.* 1999). Levant's (1992) Normative Male Alexithymia hypothesis suggests that gender differences are the result of men being discouraged by parents, peers and school-teachers, to express their feelings, subsequently affecting their emotional awareness and vocabulary.

Young adult studies also report significantly higher TAS-DDF and TAS-EOT subscale scores for males than females (Montebarocci *et al.* 2004) and adolescent studies report significantly higher TAS-EOT scores amongst males and higher TAS-DIF scores amongst females (Säkkinen *et al.* 2007). However, some adolescent studies report that significantly more females than males meet the clinical level for alexithymia (Honkalampi *et al.* 2009; Mason *et al.* 2005) and several other studies report no significant gender difference (e.g. Garisch & Wilson, 2010; Joukaama *et al.* 2007; Karukivi *et al.* 2010; Säkkinen *et al.* 2007).
The variety in reporting methods makes it difficult to draw conclusions from the above studies, with some studies presenting mean score comparisons, and others presenting clinical cut-off comparisons. In explanation of higher alexithymia amongst females in some studies and not others, Salminen *et al.* (1999) propose that some females may live with cultural expectations that females, more than males, should have emotional awareness, leading them to judge themselves more harshly in alexithymia measures.

1.3.4.3 *Alexithymia and psychological difficulties*

Strong links have been evidenced between alexithymia and psychological difficulties. Predominantly, literature indicates a link between alexithymia and depression, in both adults (Honkalampi *et al.* 2000; Kooiman *et al.* 2004; Taylor & Bagby, 2004) and in adolescents (Honkalampi *et al.* 2009). In explanation, Honkalampi *et al.* 2009 notes that the alexithymia aspect of difficulty describing feelings may be linked to internalising problems. Another alexithymia associated aspect of difficulty regulating emotions, has also been associated with psychological difficulties diagnostically described as eating disorders (Nowakowski *et al.* 2013), obsessive compulsive disorders (Robinson & Freeston, 2014) and personality disorders (Loas *et al.* 2012).

1.3.4.4 *Alexithymia and social factors*

Several studies have found sociocultural factors to be correlated with alexithymia, such as low income levels (Kokkonen *et al.* 2001; Lane *et al.* 1998; Salminen *et al.* 1999), dysfunctional affective environments (Fukunishi *et al.* 1997; Kench & Irwin, 2000; Lumley *et al.* 1996a) and certain ethnic and cultural backgrounds (Taylor *et al.* 2003). Adolescent-specific studies report high alexithymia is associated with factors such as mother's low

education, disadvantageous living conditions, family structure and early neglect (Joukamaa *et al.* 2007; Mason *et al.* 2005; Zimmermann, *et al.* 2006) and low alexithymia is associated with living in an urban area and coming from a 'white-collar family' (Joukamaa *et al.* 2007). However, Honkalampi *et al.* (2000) reported that the impact of sociodemographic factors on alexithymia was moderated by low mood and life satisfaction.

1.3.4.5 *Alexithymia, education and verbal ability*

Barchard & Hakstian (2004) found no correlation between alexithymia and cognitive abilities (verbal ability and closure, visualization and reasoning) amongst an undergraduate sample. However, Joukamaa *et al.* (2007) report a relationship between education and alexithymia. This relationship is supported by findings of significant correlations between alexithymia, reading and verbal ability (Kokkonen *et al.* 2003; Way *et al.* 2007) and findings that individuals with clinical levels of alexithymia have significantly lower levels of education than participants with lower alexithymia scores (Honkalampi *et al.* 2000; Kokkonen *et al.* 2001; Mattila *et al.* 2006; Salminen *et al.* 1999).

1.3.4.6 *Summary of alexithymia and demographic variables*

Levels of alexithymia appear to reduce throughout adolescence to adulthood and increase towards later stages of adulthood. Gender differences in levels of alexithymia are very unclear, yet most studies appear to agree that culture, SES factors and education are significantly correlated with levels of alexithymia. However, all studies presented above should be interpreted cautiously, as they varied in the size, age range and age categorisation of the sample and in the scales used to measure levels of alexithymia. Furthermore, the majority of alexithymia research has taken place in Finland, with very little research being completed with British cohorts, especially young people. Coupled with evidence that culture may impact levels of alexithymia, this emphasises the need for local research.

1.3.5 Recognising others' emotions through facial and vocal expressions

The ability to identify others' emotions from emotional cues (such as facial and vocal expressions) facilitates understanding of another person (Bird & Viding, 2014; Regenbogen *et al.* 2012), and plays a crucial role in communication (Castro & Lima, 2010) and social functioning (Frith & Frith, 2012).

1.3.5.1 *Facial Emotion Recognition (FER)*

Since the 1970's, social psychological research has established the universality of the six main facial expressions of emotion recognition (Ekman & Friesen, 1976)- happiness, anger,

fear, sadness, disgust and surprise. Most studies report that children are able to accurately recognise happiness first, followed by sadness and anger (Herba & Phillips, 2004; Widen 2013), whilst fear and disgust are the most difficult to recognise (Rodger *et al.* 2015; Durand *et al.* 2007). The few studies that have considered emotion intensity of facial emotion expressions have found that greater intensity of facial expression facilitates greater emotion recognition (Herba *et al.* 2006; Montirosso *et al.* 2010). At lower intensities, anger and sadness overlap with each other, interfering with recognition accuracy (Montirosso *et al.* 2010), and fear is generally better recognised at lower intensities than other emotions, because it signals threat, which the brain is more primed to detect (Plutchik, 1980).

1.3.5.2 *Verbal Emotional Prosody Recognition (VEPR)*

Besides the semantic meaning of spoken words, emotional prosody, using specific paralinguistic cues, including pitch, loudness and duration (Bachorowski & Owren, 2008; Vaissiere, 2005), conveys important information about the emotional state of another person (Fujisawa & Shinohara, 2011; Rigoulot & Pell, 2014). For example, anger tends to be expressed with high intensity and speech rate, whereas prosodic features of sadness tend to include low intensity and speech rate (Banse & Scherer, 1996). Verbal emotional prosody refers to emotional intonation of spoken words and non-verbal emotional prosody refers to vocal emotional utterances *without* words (e.g. screams).

1.3.5.3 *Relationship between facial and verbal emotion recognition*

Verbal emotional prosody is generally presented alongside other social cues such as facial expressions (Rigoulot & Pell, 2014). With the exception of non-verbal prosody, like laughter (Simon-Thomas *et al.* 2009), verbal emotional prosody tends to be less accurately recognised than facial emotional expressions (Gill *et al.* 2014; Scherer *et al.* 2011). Cross-cultural meta-analyses comparing facial and emotion prosody recognition report differences between facial and prosody emotion recognition depending on emotion category, with sadness and anger being most accurately recognised through verbal emotional prosody and happiness and disgust being most accurately recognised through facial expressions (Elfenbein & Ambady, 2002; Scherer *et al.* 2011). Despite these differences, research consistently reports a relationship between FER and VEPR (De Gelder & Vroomen, 2000; Pell, 2005; Rigoulot & Pell, 2012, 2014). For example, judgement of neutral verbal emotional prosody is biased by displays of facial emotions and vice versa (De Gelder & Vroomen, 2000) and VEPR and FER were significantly correlated in a study with 600 participants aged 18 to 84 (Mill *et al.* 2009).

1.3.6 Recognising others' emotions and demographic variables

1.3.6.1 *Recognising others' emotions and age*

Independent of stimulus modality (prosody or facial expression), emotion recognition is reported to deteriorate in older adults, with the greatest deterioration reported in recognition of negative emotions (Isaacowitz, 2007; Lambrecht *et al.* 2012; Mill *et al.* 2009; Mitchell, 2007). This deterioration is attributed to a combination of factors, including decreases in hearing, vision, and contrast sensitivity (Wallis *et al.* 2014), cognitive aging (Boutet *et al.* 2015), neural decline (Adolphs *et al.* 2006; Ruffman *et al.* 2008) and a decrease of personality dimensions (Allik *et al.* 2004), such as openness (McCrae & Costa, 2003), which are positively correlated with emotion recognition ability (Mill *et al.* 2009).

VEPR research with young people is limited, with the majority of emotion recognition research examining young people's FER ability. Children aged four-five years can accurately label emotions from prosodic stimuli (Friend, 2000; Morton & Trehub, 2001; Quam & Swingly; Sauter *et al.* 2013; Gill *et al.* 2014) and emotional prosody recognition is reported to improve throughout development (Dimitrovsky, 1964; Nowicki & Duke, 1994; Sauter *et al.* 2013).

FER findings are mixed, with reports that, by age of six, recognition ability of facial happiness and sadness (Durand *et al.* 2007), anger and sadness (Lawrence *et al.* 2015), or happiness and fear (Rodger *et al.* 2015) is close to adult level. Mancini *et al.* (2013) reports that FER ability continues to increase during childhood for all six basic emotions, whilst other studies report that children reach adult levels of FER ability for all six basic emotions aged 10 (Durand *et al.* 2007) or aged 13 (Rodger *et al.* 2015). Improvement in FER with age is attributed to a developing ability to successfully draw on configural properties (the position and distance between facial features and intensity of expression) to interpret emotion (De Sonneville *et al.* 2002; Leder & Bruce, 1996). However, some research has shown that children are able to use configural properties at a younger age (Brace *et al.* 2001; Gallay *et al.* 2006) and the majority of supporting evidence for this claim has not considered the impact of emotion intensity on the ability to use configural properties for FER.

1.3.6.2 *Recognising others' emotions and gender*

Across all age groups, the vast majority of studies report that females outperform males in recognising others' facial (Mancini *et al.* 2013; see McClure, 2000 and Thompson & Voyer, 2014 for a review) and prosodic expressions (Fujisawa & Shinohara, 2011; see Thompson & Voyer, 2014 for a review). Thompson & Voyer (2014) report that this advantage is likely to be moderated by emotion, sex of the actor (male actors produce larger effect sizes than

female actors), sensory modality (visual, audio or audio-visual) and participant age (females under 13 years show smaller effects sizes and females aged 18-30 show largest effect sizes). Indeed, studies have reported a moderating effect of emotion category on gender difference of FER, with females more accurately recognising facial anger (and some studies also reporting disgust), but not other emotions (Campbell *et al.* 2002; Montirosso *et al.* 2010). Females' advanced recognition of negative emotions is suggested to serve social and evolutionary functions, with negative emotions triggering a female protective caregiver response to aid infant survival and promote secure attachment (Hampson *et al.* 2006). Conversely, Thompson & Voyer (2014) propose that males are more aroused by negative emotional stimuli, resulting in reduced task concentration and performance.

Studies have also supported the moderating effect of sensory modality on gender difference of emotion recognition, with reports that the female advantage is larger when integrating visual and auditory information (Thompson & Voyer, 2014). This finding is explained by the female brain being less lateralised than the male brain, allowing improved emotion recognition processing overall and from multiple sources (Fine *et al.* 2009; Pell, 2006). However, emotion prosody contradicts this explanation, with reports that, relative to males, adolescent females' emotion prosody recognition is better for happiness and sadness, but not for anger (Bonebright *et al.* 1996; Fujisawa & Shinohara, 2011). Instead of a lateralised brain explanation, gender differences in facial and prosodic emotion recognition ability might be more strongly moderated by the impact of hormone levels on brain development and functioning (Everhart *et al.* 2006; Neufang *et al.* 2009; Fujisawa & Shinohara, 2011; Scherf *et al.* 2012). For example, Lawrence *et al.* (2015) found that young people's ability to recognise disgust and anger increased from mid to late puberty (independent of age) and Fujisawa & Shinohara (2011) found no gender differences in emotional prosody recognition in early childhood, but significant gender differences, related to testosterone levels in adolescence.

Similar to Levant's Normative Male Alexithymia hypothesis, gender differences in recognising others' emotions are suggested to arise from different patterns of adult-guided interaction (Mancini *et al.* 2013), with girls being exposed to more expressive environments than boys and being more encouraged to recognise emotions (McClure, 2000).

1.3.6.3 *Recognising others' emotions and culture*

The universality hypothesis assumes that emotional expressions are universally recognised (Ekman & Cordaro, 2011; Izard, 1994; Matsumo *et al.* 2008), and this has been supported

by a number of studies (Elfenbein & Ambady, 2002; Thompson & Balkwill, 2006; Pell *et al.* 2009). However, emotion recognition accuracy is higher when emotions are expressed and recognised by members of the same national, ethnic, or regional group and some cultures differ in their reliance on sensory modality (facial or prosodic emotional cues) in recognising emotions (Riviello & Esposito, 2012). This is described as an in-group advantage or dialect theory, proposing that facial and vocal expressions are shaped by geographic, national and social boundaries and subsequently vary by culture, decreasing emotion recognition by outgroup persons (Dailey *et al.* 2010; Elfenbein *et al.* 2007).

1.3.6.4 *Recognising others' emotions and cognitive ability*

Cognitive and verbal ability are reported to relate to FER ability (Barchard & Hakstian, 2004; Herba & Phillips, 2004; Mitchell, 2007; Moore, 2001), supporting improved ability to attend to a number of stimuli and the necessary verbal ability to think abstractly and conceptualise emotions (Herba & Phillips, 2004). Yet, some critics argue that correlations between IQ and FER skills are moderate (Montirosso *et al.* 2010) or unrelated (Montirosso *et al.* 2010; Sullivan & Ruffman, 2004). Of note, this lack of relationship might be related to the use of a matching task (Herba *et al.* 2006, 2008), relying on visuospatial, rather than verbal ability and samples not necessarily being representative of the general population (Montirosso *et al.* 2010).

The relationship between cognitive/verbal intelligence and emotional prosody recognition ability has not attracted a consensus either (Wells & Peppe, 2003). Some research reports no relationship between verbal ability and emotional prosody recognition performance (Wells & Peppe, 2003), suggesting that prosody may be relatively independent from other language abilities. On the other hand, Weinert (1992) found that prosody and language impairments are related. However, these studies were completed with children of different ages, so it might be the case that children rely on prosody more in the earlier stages of language acquisition, but that in later childhood prosody becomes a more independent cognitive domain (Stojanovik, 2011).

1.3.6.5 *Recognising others' emotions and social factors*

Some research suggests that those from deprived social backgrounds are significantly more at risk of developing emotional difficulties (Caspi *et al.* 2002; Leventhal & Brooks-Gunn, 2000), whilst other studies report socio-demographic status to be unrelated to ER ability (Herba *et al.* 2006, 2008; Montirosso *et al.* 2010). Variation in findings may reflect different ways of measuring and categorising socio-demographic factors (e.g. parents' occupation or accommodation post code). Low sociodemographic status has been related to recognition

of certain emotions, such as fearful or angry expressions, which has been attributed to a threatening environment priming children towards the recognition of negative emotional experiences (Herba & Phillips, 2004). Social factors such as parental conflict and family break-down (Bradley & Corwyn, 2002; Pollak *et al.* 2009), abuse and neglect (Pollak & Sinha, 2002), attachment style and mood (Schmid & Schmid*,* 2010) are also reported to impact on emotion recognition ability.

1.3.6.6 *Limitations*

Many of the above findings are inconclusive, with cross-study interpretation difficult due to a number of limitations. Firstly, studies varied in age group categorisation, emotional categories used (Isaacowitz *et al.* 2007), distribution of gender (some studies do not even report gender), cultural background and education. Of note, easier to recognise emotions might create a ceiling effect and make between group emotion recognition differences difficult to accurately detect (Isaacowitz *et al.* 2007).

Secondly, studies varied in stimuli presented (lexical; facial; verbal prosody; non-verbal prosody; cartoons, photos; videos) and response formats (emotion matching; multiple choice labelling; free labelling), which affect emotion recognition ability (e.g. Isaacowitz *et al.* 2007). For example, matching procedures rely more on visual and spatial abilities (Herba *et al.* 2006), free labelling requires verbal ability, and a multiple- choice response format, although minimizing verbal demands, provides evidence of emotion recognition on the basis of semantic characteristics (Camras & Allison, 1985) and artificially narrows what would otherwise be quite variable perceptions (Bryant & Barrett, 2008).

Age and cultural differences between stimulus and participant have also been found to have an impact on emotion recognition scores (Ebner & Johnson, 2009), with evidence for an own-age (Proietti *et al.* 2015) and own culture bias (Elfenbein & Ambady, 2002). Lastly, attention levels are also likely to vary across studies, with some procedures involving 36 presented stimuli (Sullivan & Ruffman, 2004) and others 120 stimuli presented twice (Lambrecht *et al.* 2012). All of the above factors are likely to confound results if not controlled for.

1.3.6.7 *Summary of recognising others' emotions and demographic variables*

The ability to recognise emotions from facial and prosodic expressions generally improves with age. Emotion recognition research findings can be affected by type of measure used, emotions investigated, gender and sociocultural factors. Overall, the majority of emotion recognition findings are drawn from FER research, conclusions from cross-study comparison

of findings are often contradictory. The aforementioned limitations have led many authors to call for further emotion recognition research, especially VEPR research, with young people.

1.3.7 Measuring facial and prosody emotion recognition

1.3.7.1 *Facial emotion recognition measures (see section 2.5.4 for details)*

Although FER measures such as the Diagnostic Analysis of Nonverbal Accuracy 2- Adult Facial Expressions Test (Nowicky, 2001; Nowicky & Duke, 1994) are available, the Ekman-Friesen Pictures of Facial Affect test (PFA; Ekman & Friesen, 1976) remains the most widely used test to study FER ability of the six basic emotions (Ekman & Cordaro, 2011). The test involves selecting which emotion is best represented by each of a series of photographs of male and female faces. It has good reliability (Ekman & Friesen, 1976; Frank & Stennet, 2001), has been used with different age groups from young children (Uljarevic & Hamilton, 2013) to older adults (Calder *et al.* 2003) and has been successfully used with YPwO (Bowen *et al.* 2013; Jones *et al.* 2007; McCown *et al.* 1986, 1988; Sato *et al.* 2009).

It is recommended that emotion intensities are considered when assessing emotion recognition ability to provide insight into difficulties identifying less intense facial expressions (Herba *et al.* 2006), as day to day, emotions are rarely displayed at their maximum intensity. Accordingly, photographs from the PFA test (Ekman & Friesen, 1976) have been successfully morphed with neutral expressions to create different levels of emotion intensities, in research with children (Montirosso *et al.* 2010) and YPwO (Bowen *et al.* 2013; Gonzaez- Gadea *et al.* 2013). Therefore, the PFA test (Ekman and Friesen, 1976) with varying emotional expression intensities (25%, 50%, 75%, 100%) will be used in the current study to aid cross-study comparison.

1.3.7.2 *Verbal emotional prosody recognition measures (see section 2.5.5 for details)*

Although most studies develop their own prosody recognition measures (many of which include utterances rather than verbal content), a review of the literature identified a number of published verbal emotional prosody measures with good psychometric properties, including the Aprosodia Battery (Ross *et al.* 1997), the Bell-Lysaker Emotion Recognition Test (Bell *et al.* 1997), and the Florida Affect Battery-Revised (Bowers *et al.* 1991). However, in light of the dialect theory (see1.4.6.3) and research evidencing the relationship between culture and VEPR (Bryant & Barrett, 2008; Riviello & Esposito, 2012; Thompson & Balkwill, 2006), the VEPR measure used in the current study has been developed using actors with Welsh accents.

The VEPR Task (Davies, 2015) was developed by a previous Cardiff Clinical Psychology Trainee and consists of 30 semantically neutral statements (*"His glasses are on the table";* Boaz *et al.* 2011). The statement is spoken 15 times by a male actor and 15 by a female actor in one of the four universal emotions: neutral prosody and four emotional tones (anger, fear, happiness and sadness). The VEPR task has been piloted, with all items reaching good reliability ($r > .80$) and has since been used in clinical research (Davies, 2015).

1.3.8 Relationship between alexithymia and emotion recognition of others

The same brain regions are reported to be involved in recognising emotions in oneself and recognising emotions in others (Heberlein & Adolphs, 2007; Heberlein & Atkinson, 2009), suggesting a link between alexithymia and FER and VEPR ability. Theoretically, Bird and Viding (2014) propose that alexithymia primarily manifests in Affective Representation System impairment, whereby deficits in recognising one's own emotions creates difficulty in associating emotional cues (i.e. facial or prosodic expressions) to others' emotional states. In support of this idea, a large body of evidence reports alexithymia to be related to FER and VEPR deficits (Grynberg *et al.* 2012; Lane *et al.* 1996, 2000; Mann *et al.* 1994; Parker *et al.* 1993; Prkachin *et al.* 2009; Vermeulen *et al.* 2006). These deficits are especially marked under temporal (Jongen *et al.* 2014; Parker *et al.* 2005; Swart *et al.* 2009) or perceptual (emotion intensities) (Cook *et al.* 2013) constraints.

Despite the above findings, whether recognition of others' emotions is impaired in those with alexithymia has not reached a consensus (Jongen *et al.* 2014; Montebarocci *et al.* 2011). Links between alexithymia and emotion recognition deficits (of facial and prosodic emotional expressions) are reported to be mediated by anxiety, depression (Grynberg *et al.* 2012; Naranjo *et al.* 2011) and verbal intelligence (Montebarocci *et al.,* 2011). A number of studies report no significant correlations between alexithymia and FER (Kessler *et al.* 2006; Mann *et al.* 1995; Pandey & Mandal, 1997) and VEPR (Swart *et al.* 2009), although these studies were completed with substance abusers (Mann *et al.* 1995), with individuals with eating disorders (Kessler *et al.* 2006), and with an exclusively Hindu sample (Pandey & Mandal, 1997). Although Pandey & Mandal (1997) report that emotion recognition between the non-alexithymia and alexithymia group was not significantly different, emotion recognition between the non-alexithymia and high alexithymia group was significantly different.

1.3.8.1 *Research limitations of alexithymia and recognising others' emotions*

Disparity in results can be attributed to studies using a variety of measures, to studies categorising participants as alexithymic and non-alexithymic (with variations in alexithymia

categorisation), and to the exclusive use of self-report alexithymia measures, despite recommendations for a multi-method alexithymia measure (Lichev *et al.* 2014; Lumley *et al.* 2005). Additionally, potentially confounding variables of language and cognitive skills (Borgers *et al.* 2000; Marsh *et al.* 2005), were controlled for in one study (Montebarocci *et al.* 2011). Lastly, providing further support for examining alexithymia, FER and VEPR with a sample of YPwO and an adolescent control group, only three studies measured prosody as a modality of emotion recognition (Lane *et al.* 1996, 2000; Swart *et al.* 2009) and no studies were identified that had used non-clinical adolescents or YPwO samples.

1.3.9 Emotion recognition and young people who offend

Section 1.2.2 of this chapter presented a general biopsychosocial framework of offending behaviour; how early life stressors have lasting effects on brain architecture and cognitive processes involved in regulation of emotions and behaviour and effective management of situations and relationships (Fox *et al.* 2010; Young *et al.* 2007). Section 1.3.2 discussed, in further detail, how early life experiences specifically support the development of emotional skills. Building on information discussed thus far, this section presents a summary of theory and research relating to emotion recognition deficits and offending behaviour (for a systematic review of the literature, see section 1.6). As noted in section 1.6, a number of limitations need to be considered when interpreting findings from studies of alexithymia and FER amongst YPwO, such as studies not controlling for potentially confounding variables, not matching samples and only recruiting male participants.

1.3.9.1 *Alexithymia and YPwO*

A handful of studies were identified that had specifically explored alexithymia amongst YPwO (Berastegui *et al.* 2012; Langevin & Hare 2001; Moriarty *et al.* 2001; Möller *et al.* 2014; Zimmermann, 2006). Two studies, not available in English (Berastegui *et al.* 2012; Langevin & Hare 2001), reported alexithymia as predictive of offending behaviour in adolescents (Berastegui *et al.* 2012) and alexithymia and psychopathic traits in YPwO being significantly correlated (Langevin & Hare, 2001). Of the remaining three studies (discussed in the systematic review), all reported YPwO show higher alexithymia than the control group (Möller *et al.* 2014; Moriarty *et al.* 2001; Zimmermann, 2006), although these differences only met statistical significance in one study (Zimmermann, 2006). Subgroup analysis of the YPwO population, indicated that violent offenders scored higher on TAS -20, although differences were not statistically significant (Möller *et al.* 2014).

1.3.9.2 *Facial emotion recognition and YPwO*

As previously noted, a large body of forensic research focusses on diagnostic labelling

(Preston *et al.* 2015), and accordingly the main body of emotion recognition research with young people (some of whom are YPwO) has explored the extent to which psychopathy (Blair *et al.* 2001; Dadds *et al.* 2006), callous unemotional traits (Bennett & Kerig, 2014; Jusyte *et al.* 2014; Wolf & Centifanti, 2014), conduct disorder (Fairchild *et al.* 2009) and anti-social behaviours (Blair & Coles, 2000; Dadds *et al.* 2006; Marsh & Blair, 2008) are associated with facial emotion recognition deficits (some of these samples included YPwO). A review of the literature did identify a number of studies with a specific focus on FER deficits and offending behaviour amongst young people, which report both overall FER deficits (Gonzalez-Gadea *et al.* 2014) and specific FER deficits for negative emotions such as sadness (Bowen *et al.* 2013; McCown *et al.* 1986), anger (Bowen *et al.* 2013; Jones *et al.* 2007), disgust (Jones *et al.* 2007; McCown *et al.* 1986; Sato *et al.* 2009) and fear (Bowen *et al.* 2013). A study specifically exploring risk factors of offending with young people with looked after status was also identified, which reported that YPwO (with and without looked after status) made significantly more FER errors than young people without a known offending history (Schofield *et al.* 2015). Subgroup analysis of YPwO samples has revealed a significant negative correlation between FER and violent offences (Carr & Lutjemeier, 2005). Bowen *et al.* (2013) report that relative to YPwO with low intensity offences, YPwO with high severity offences show lower recognition scores on *low* intensity expression of anger, and higher recognition scores on *high* intensity expression of anger.

1.3.9.3 *Verbal prosody emotion recognition YPwO*

A review of the literature did not identify any studies exploring VEPR with YPwO. The only emotional prosody studies identified, focused on the relationship between psychopathic traits and emotion recognition (see Dawel *et al.* 2012 for review) in adult forensic samples (Bagley *et al.* 2009; Blair *et al.* 2002; Mitchell *et al.* 2006; Suchy *et al.* 2009) and pupils attending schools which support social, emotional and behavioural needs (Blair *et al.* 2005a; Stevens *et al.* 2001). Dawel *et al*. (2012) conclude that these participant groups present with a specific deficit in recognising fear from vocal cues. Despite the lack of research with YPwO, one might hypothesise that YPwO will show VEPR deficits, based on findings with individuals presenting with similar difficulties as YPwO (Dawel *et al.* 2012), the significant correlation between FER and VEPR and reports that YPwO show significant FER deficits.

1.3.9.4 *Theoretical understanding of relationship between emotion recognition and offending*

1.3.9.4.1 Mentalisation theory

Mentalisation theory (Fonagy, 1989), explains how adverse life experiences can predispose emotion recognition deficits and set the stage for the development of offending behaviour. Fonagy suggests that a child's early caregiver interaction predicts ability later in life to

recognise feelings, such as aggressive impulses, and to use alternative ways to express and regulate these feelings in a socially acceptable way (Allen *et al.* 2008). In support of this idea, research reports that children with a secure attachment are more likely to identify their own emotions and to express them in a regulated way compared to children with an insecure attachment, who are more likely to magnify expressions of emotions in line with the magnified responses from their early social experiences (Crittenden, 2006). Furthermore, alexithymia has been associated with a reduced ability to regulate one's emotions, and subsequently increases the risk of violent expression of emotional states (Nehemiah *et al. 1976*; Fossati *et al.* 2009) and offending behaviour (Fonagy, 2003; Möller *et al.* 2014).

1.3.9.4.2 Negative attribution bias

Negative early relationship experiences are also reported to predispose a person to negative attribution bias (Dodge, 2006; Price & Glad, 2003), which refers to an increased likelihood of interpreting others' social responses and actions as hostile or malicious. For example, children might observe and model their parent's style of social responding and parents might reinforce a value system in the child that is broadly consistent with their own, or parents may interpret their child's behaviour negatively and use harsh discipline, which in turn may result in the child developing a hostile attribution bias (Bugental & Johnston, 2000; Halligan *et al.* 2007). It is proposed that a person's hostile attribution bias results in negative schemas and emotions and more frequent selection of hostile behaviours (Dodge, 1980, 2006; Crick & Dodge, 1996; Penton-Voak *et al.* 2013). Supporting this idea, a meta-analysis including studies involving over 6000 children and young people reported an association between hostile attributions and aggressive behaviour (Orobio de Castro *et al.* 2002). Support for the theory of hostile attribution bias has also been reported specifically with populations of YPwO (Dodge *et al.* 1990, Penton-Voak *et al.* 2013; Sato *et al.* 2009). However, although the negative cycle of hostile attributions and actions is evidenced among YPwO, it remains unclear whether a negative attribution bias leads to antisocial behaviours or whether engaging in antisocial behaviours leads to a negative attribution bias (Dodge & Petit, 2003)

1.3.9.4.3 Integrated Emotions Systems Theory

Integrated Emotions Systems (IES) theory is a neurocognitive model (Blair*,* 2005), which stems from Blair's original idea of the Violence Inhibition Mechanism (VIM; Blair, 1995). IES suggests that recognition of others' emotional distress (e.g. through facial or prosodic expressions of fear and sadness) acts as a form of punishment and elicits guilt and empathy. These emotional responses of guilt and empathy decrease the likelihood of engaging in the behaviour which caused that distress (Eisenberg, 2000; Marsh & Blair, 2008).

IES theory suggests that, as a result of poor conditioning, individuals presenting with anti-social behaviours fail to learn to associate negative emotions with harmful actions (Marsh & Blair, 2008), causing them to feel less punished by others' distress, less empathic and less likely to inhibit the behaviour that caused the distress. According to the IES theory, this cognitive dysfunction in successfully processing others' distressing emotions is caused by impairment in different brain areas. For example, fear and sadness recognition predominantly relies on the amygdala, disgust recognition predominantly relies on the insula and basal ganglia and anger recognition predominantly relies on the orbitofrontal cortex area of the brain (Adolphs & Spezio, 2006; Best *et al.* 2002; Hornak *et al.* 2003). In support of this idea, neurological dysfunctions have been reported in these brain areas amongst adult anti-social populations with psychopathic traits (Birbaumer *et al.* 2005; Blair, 2003) and young people with conduct disorder (Passamonti *et al.* 2010). However, even though Passamonti *et al.* (2010) included YPwO in their 'conduct disorder' sample (alongside young people from schools and pupil referral centres), further research is required to assess neurological deficits amongst offending samples specifically to provide support for the applicability of the IES theory to YPwO.

1.3.9.4.4 Self to Other Model of Empathy

Similar to the IES theory (although presented within a developmental as opposed to neurocognitive framework) the Self to Other Model of Empathy (SOME; Bird & Viding, 2014) suggests that deficits in recognising one's own emotions leads to deficits in recognising others' emotions, which results in reduced levels of guilt and empathy (Meins *et al.* 2002; Murray & Andrews, 2005) and prosocial behaviour patterns (Baumeister & Lobbestael, 2011; Bird & Viding, 2014; Regenbogen *et al.* 2012). In support of this idea, alexithymia levels are reported to be predictive of empathic brain activity (Bird *et al.* 2010; Silani *et al.* 2008) and a significant negative correlation has been reported between empathy and offending behaviour amongst YPwO (Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014).

1.3.9.5 *Emotion recognition interventions and YPwO*

As emotional skill deficits are related to reduced levels of emotions such as guilt, using punitive measures to control offending is unlikely to be effective (Syngelaki *et al.* 2013). Difficulties with emotional awareness and expression (Lane & Garfield, 2005) can also adversely impact interpersonal skills, creating difficulties with the development of a therapeutic relationship (Mallinckrodt & Wei, 2005; Vanheule *et al.* 2007). A number of cognitive training interventions focused on emotion recognition have been shown to improve the behavioural and cognitive processes involved in emotion recognition, including improvements in empathy and behaviour amongst children (Dadds *et al.* 2012), and

reductions in negative attribution biases (Guerra & Slaby, 1990; Penton-Voak *et al.* 2013) and improvements in FER (van Goozen *et al.* 2013) amongst YPwO. Such positive outcomes are likely to develop an understanding of emotional expressions, to improve mood and social relationships and to reduce offending behaviour (Dadds *et al.* 2012; Penton-Voak *et al.* 2013). Further research is needed to examine whether emotion recognition improvements through cognitive training lead to enduring neurological, social and behavioural change.

1.3.9.6 *Emotion recognition and YPwO section summary*

Broadly speaking, the emotion recognition literature identified alexithymia to be higher and FER ability to be lower amongst YPwO, compared to non-offending samples. This section highlighted the limitations of existing research examining emotion recognition in YPwO, such as the lack of VEPR studies and the lack of studies measuring both alexithymia and ability to recognise others' emotions. Theories of emotion recognition and offending propose that neurodevelopmental factors cause emotion recognition problems, which contribute to reductions in empathy and subsequent pro-social behaviour. The current study aims to build on previous research by also investigating VEPR and comparing alexithymia with the ability to recognise others' emotions (VEPR and FER), relating findings to offence type, frequency and severity amongst YPwO. It is hoped that the study findings will help inform interventions for YPwO.

1.4 Social support

1.4.1 Introduction to social support concepts

The concept of social support emerged as a major topic in the field of community and social psychology in the 1970's (Cohen & Syme, 1985; Pierce *et al.* 1997). Although researchers agree that social support is a complex, multi-dimensional paradigm (see Table 1.1 for social support dimensions) (Barrera, 1986, Gottlieb & Bergen, 2010; Hogan *et al.* 2002; López & Cooper, 2011; Rodriguez & Cohen, 1998; Sarason, 1974), there is little agreement amongst researchers of the best way to understand, define or measure it (Lakey & Cohen, 2000; Johnson *et al.* 2011). Broadly speaking, social support can be said to consist of interactions which provide varied types of resources (emotional, instrumental or informational), aiding the recipient's health and well-being and/or their ability to cope and adapt to stressful life events (Barrera, 1986; Lakey & Cohen, 2000; Thompson, 1995).

Table 1.1: Definitions of social support dimensions

Social support dimension	Definition
Structure	The number and pattern of social ties/network surrounding an individual (from all sources-see below)
Function	The varied types of resources flowing through the social network (Emotional, instrumental/materialistic, informational)
Source	**Informal:** support from family, friends, partner, neighbour **Formal:** support from professionals and community services
Direction	Whether support is given or received, unidirectional or bi-directional

Social support provision can be informal (from friends, family, partner or neighbour) or formal in nature (professional, religious or community services) (Lakey & Cohen, 2000; Thompson, 1995). Social support can be divided into three concepts including (1) *Social connectedness/ embeddedness*; (2) *Perceived social support and* (3) *Actual or enacted social support* (Barrera, 1986; Burleson & MacGeorge, 2002; Sarason *et al.* 1990; López & Cooper, 2011). The current study is interested in perceived quantity and quality of informal social support, which can be described as the interpersonal resources perceived to be available to provide support during time of need (Hardan-Khalil & Mayo, 2015). Studying informal rather than formal support seems apt, as the majority of social support generally arises through friends and family (Leach, 2015).

1.4.2 Social support measures (also see section 2.5.2)

Social support measures such as the Arizona Social Support Interview (ASSI; Barrera, 1980), the Duke UNC Functional Social Support Questionnaire (Duke UNC-SSQ; Broadhead *et al.* 1988), the Norbeck Social Support Questionnaire (NSSQ; Norbeck *et al.* 1981), the Perceived Social Support Scale (PSSS; Procidano & Heller, 1983) and the Social Support Questionnaire (SSQ; Sarason *et al.* 1983) have been criticised for not measuring sources of support (Duke UNC-SSQ, MOS-SSS), being lengthy to administer (ASSI, PSSS, SSQ, NSSQ) and only measuring certain social support functions (Duke UNC-SSQ, SSQ) (Canty-Mitchel & Zimet, 2000; Lincoln, 2000; Lopez & Cooper, 2011). Lengthy measures might cause a particular challenge in the current study where multiple constructs are being measured (Frey & Rothlisberger, 1996; Procidano & Heller, 1983). Adolescent-specific measures include the Social Support Scale for Children (Harter, 1985), which is only applicable for ages 8-14, and the more recent Child Social Support Scale (Malecki & Demaray, 2002). Both measures assume teacher and class-mate contact and do not assess social support from a significant other, which is particularly important for adolescents, for whom there is increased influence of individuals outside of the family (Canty-Mitchel & Zimet, 2000). Most measures also lack an integrated theoretical foundation (Lincoln, 2000).

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet *et al.* 1988) addresses several of the above issues. As the most widely used and recommended research measure of perceived social support (Osman *et al.* 2014), the MSPSS is brief and theoretically grounded in Barrera's (1986) primary properties of social support and the idea of different social support sources having different functions (Osman *et al.* 2014). Accordingly, the MSPSS assesses self-reported availability and adequacy of emotional and instrumental dimensions of support from three sources: family, friends and significant others. Although it has been suggested that the majority of MSPSS items are associated with the general factor of perceived social support, rather than with the source-specific factors (family, friends, significant others) (Osman *et al.* 2014), the majority of the literature has indicated good internal reliability and validity for each of its subscales and for the measure as a whole (Hardan-Khalil & Mayo, 2015; Zimet *et al.* 1988, 1990). Despite potential self-reporting biases (Gore, 1981), measures of perceived social support have the strongest relationship with measures of psychological distress and well-being (Gjesfjeld *et al.* 2010; Rodriguez *et al.* 2010; López & Cooper, 2011) and so too does the MSPSS, with significant positive correlations between high MSPSS scores and low levels of depression and hopelessness (Osman *et al.* 2014). The reliability, validity, and factor structure of the MSPSS are robust with adolescent samples (Bruwer *et al.* 2008, Canty-Mitchel & Zimet, 2000; Ramaswamy *et al.* 2009).

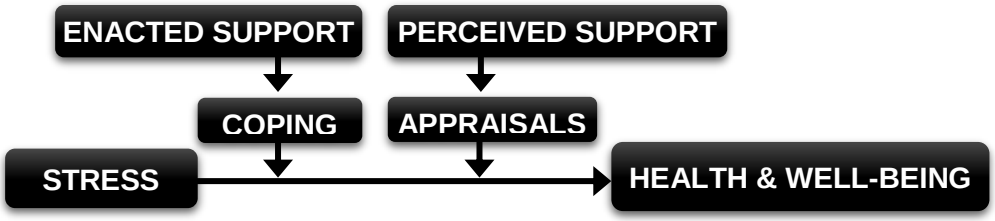
1.4.3 Social support outcomes: theoretical perspectives

From the time when it was first recognised, social support has been proposed to benefit health and well-being (Caplan, 1974; Cobb, 1976, Dean & Lin, 1977), to reduce negative experiences, to ensure positive experiences and to encourage a set of socially rewarding roles, predictability, stability and self-worth (Cohen & Wills, 1985; Procidano & Walker-Smith, 1997). Since that time, research has continued to document social support as one of the most important psychosocial benefits to physical health (Anderson *et al.* 2006, 2007; O'Donovan & Hughes, 2008; Uchino, 2004), and psychological well-being (Helgeson, 2003; Kafetsios & Sideridis, 2006). The process by which social support is proposed to be beneficial varies according to three overarching theoretical models of social support (Lakey & Cohen, 2000); (i) The Stress and Coping Perspective, which proposes social support improves well-being as it buffers stress, and (ii) the Social Constructionist Model and (iii) Relationship Model, which propose social support has an overall 'main-effect' on well-being, irrespective of stress. Brief reviews of these theories will be presented in turn.

1.4.3.1 *The Stress and Coping Perspective*

The Stress and Coping Perspective is the most widely studied theoretical model of social support. The model proposes that social support contributes to health by protecting the receiver from the adverse effects of stress, with *enacted* (received) support enhancing coping ability and *perceived* support leading to appraisal of difficult or threatening experiences as being less stressful (Cohen & McKay, 1984) (see Figure 1.3). In support of this idea, individuals who report higher levels of perceived support, appraise the slant of a hill as significantly less steep compared to individuals reporting lower levels of perceived support (Schnall *et al.* 2008).

Figure 1.3: The stress and coping perspective (adapted from Lakey & Cohen, 2000)



However, research examining the outcomes of enacted support on distress tolerance and well-being has resulted in very mixed findings (Goldsmith, 2004; Procidano & Walker-Smith, 1997; Chen & Feeley, 2012), with a number of studies reporting that *perceived*, as opposed to *enacted*, social support improved coping and reduced depressive symptoms after traumatic events (Mikulincer & Shaver, 2008; Shahar *et al.* 2009). Mixed findings might be attributed to different types of social support proposed to have varying impact on different types of well-being (Boehmer *et al.* 2007). For example, emotional enacted support has been reported to have both positive (Chen & Feeley, 2012; Reinhardt *et al.* 2006) and negative (Bolger *et al.* 2000) impact, and instrumental enacted support has been reported to include negative effects (Reinhardt *et al.* 2006). In explanation, social support can reduce one's perceived level of self-efficacy (Reinhardt *et al.* 2006; Chen & Feeley, 2012) and create feelings of guilt, anger, or shame at receiving assistance (Sarason, 1990). Negative outcomes may also be dependent on the receiver's attachment style (Bartholomew *et al.* 1997), the emotional meaning attributed to enacted support (Semmer *et al.* 2008) and receivers' sense of the providers' level of empathy (Faulkner & Layzell, 2000).

1.4.3.2 *The Social Constructionist perspective*

The Social Constructionist Perspective is primarily concerned with perceived social support (Lakey & Cohen, 2000) and aligns itself with main-effects benefit on well-being. The perspective stems from work by epidemiologist John Cassel and psychiatrist Sidney Cobb, proposing that perceived support influences self-esteem and identity, which then indirectly

influences health and well-being (Kaul & Lakey, 2003), as well as perceived social support having a direct main-effect influence on health and well-being, irrespective of the presence of stress (see Figure 1.4).

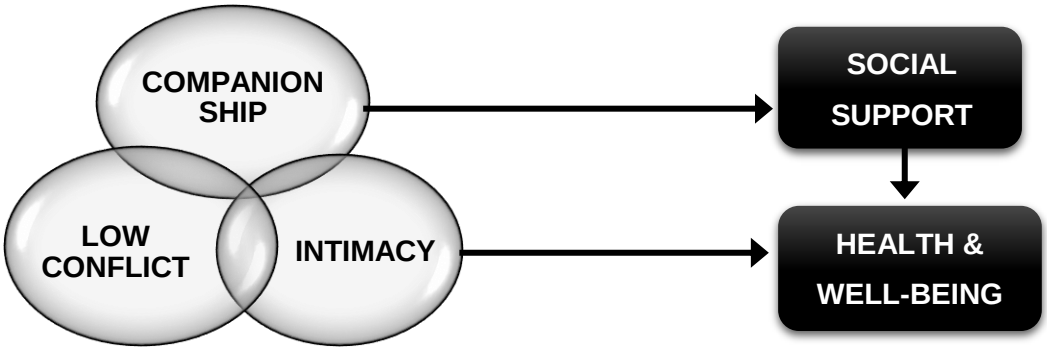
Figure 1.4: Social constructionist perspective (adapted from Lakey & Cohen, 2000)

Although Siewert *et al.* (2011) report perceived social support to be unrelated to well-being, they employed no control group and a small sample of healthy participants. Generally, perceived support (in particular perceived *emotional* support) has been positively associated with subjective well-being (Reinhardt *et al.* 2006), optimism and reduced loneliness (Mikulincer & Shaver, 2008). However, research proposing social support to have a main-effect on recipient health and well-being, should be interpreted with caution, as it mostly assesses social support outcomes of major stressful life events and not daily stressors. So, what might appear as a main effect of perceived social support might actually be an unassessed stress-buffering effect (Cohen *et al.* 2000).

1.4.3.3 *The Relationship Perspective*

The Relationship Perspective (Reis & Collins, 2000) predicts that the health effects of social support cannot be separated from relationship processes that often co-occur with support, such as companionship, intimacy, social skills and low social conflict (Sarason, 1974; Thompson *et al.* 2006). This model proposes that relationship qualities and processes are the key factors that simultaneously affect perceived support and/or enacted social support and overall well-being (Dunst *et al.* 1984, Dunst & Leet, 1987; Lyons *et al.* 1998), emphasizing main effects rather than stress-buffering effects (see Figure 1.5).

Figure 1.5: The relationship perspective (adapted from Lakey & Cohen, 2000)



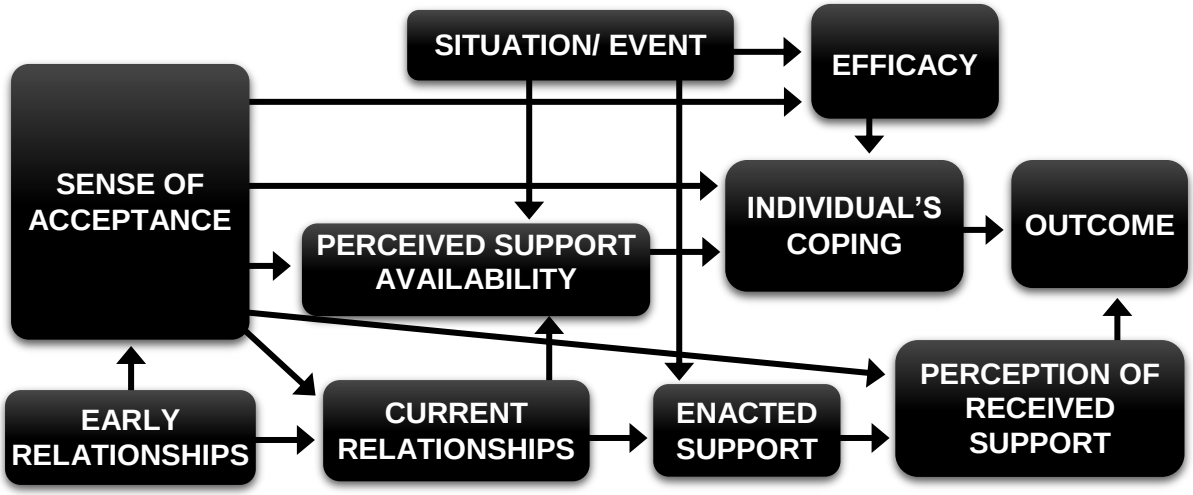
This model emphasises the importance of considering how interpersonal concerns, conflicts and processes mediate the use, impact and outcome of social support (Taylor *et al.* 2004). For example, support provided in a grudging manner might make the recipient feel indebted or incompetent (Gottlieb & Bergen, 2010). Similarly, support providers' mood or approach (problem or emotion-focused or avoidance- focused) can have an impact on the nature and impact of support provision (Cohen *et al.* 2000).

1.4.3.4 *Social Support: an Integrated Perspective*

Understanding the process by which social support can be beneficial has important implications for design and delivery of social support intervention. However, despite extensive research indicating the benefits of social support on health and well-being, the processes by which social support exerts benefits remains only partially understood (Johnson *et al.* 2011; Tanzer *et al.* 2013).

Nevertheless, perceived social support has been found to be *more* consistently related to main-effect well-being *and* stress-buffering coping effectiveness, than received/enacted social support (Chen & Feeley, 2012; Cohen & Wills, 1985; Wethington & Kessler, 1986). Research findings indicate that any positive influence of enacted support is mediated by a recipients' sense of support perceived (Wethington & Kessler, 1986) personality qualities (Procidano & Walker-Smith, 1977) and psychological resources (Chen & Feeley, 2012). Accordingly, in their Integrated Model of Perceived Social Support (IMPSS), Sarason *et al.* (1990) suggest how a sense of acceptance is the central personal characteristic, which alongside past and present relationships, contribute to perceived availability and quality of social support and outcome (see Figure 1.6). The IMPSS proposes that early attachment experiences, such as caregiver availability and responsiveness (Bowlby, 1977, 1988; Epstein, 1980) shape an individuals' sense of acceptance and later relationships. Incorporating the social-cognitive perspective, the IMPSS describes these early experiences impact on every-day appraisal, memory of and attention to support (Lakey & Cohen, 2000). Early experiences have indeed been found to impact social support, with reports that attachment styles are related to the availability of socially supportive relationships, social support skills (Ma, 2006), willingness to seek social support (Bartholomew *et al.* 19997) and feelings experienced at receiving support (Sarason *et al.* 1990). This has also been evidenced with YPwO, who have reported that a damaged self, complexity of relationships and internal conflict acted as barriers to seeking social support (King *et al.* 2014).

Figure 1.6: Integrated perspective of perceived social support and outcome (Sarason et al. 1990)



1.4.4 Social support and demographic variables

Contextual factors are likely to affect the size and type of an individual's support network and their perceptions and use of perceived and received support (Hardan-Khalil & Mayo, 2015).

1.4.4.1 *Social support and age*

Socially supportive relationships are critical for development and psychological adjustment, especially during adolescence (Brown, 2004; Collins & Steinberg, 2008). Different sources of support provide different benefits during different developmental periods (Rodriguez *et al.* 2003). For example, for adolescents, there is increased influence of individuals outside of the family (Canty-Mitchel & Zimet, 2000). This is reflected by adolescents turning to peers or relying on self-coping rather than accessing support from adults (Lambourn, 2009), as primary bonds to parents transition to bonds with peers (de Goede *et al.* 2009). Yet research also suggests that the presence of a supportive family during adolescence eases the effects of stressful life events, while peers can potentially exacerbate them (Dubow *et al.* 1997).

1.4.4.2 *Social support and gender*

In a review of the literature, Rose & Rudolph, (2006) report that female children and adolescents seek support in response to stress more than male children and adolescents and, reporting results from over 500 participants aged 13-25, Landman-Peeters *et al.* (2005) report that poor social support is related to distress more in females than in males. These findings might be explained by social roles, whereby women rely more on socially supportive relationships to manage distress, whereas males are encouraged to be more autonomous and independent (Olsen & Schultz, 1994).

Research with adolescents suggests that females report higher levels of social support than males (Bruwer *et al.* 2008; Ramaswamy *et al.* 2009) and receive different levels of social support from different sources (Chapman, 2003). For example, in comparison to male adolescents, female adolescents report lower levels of family support (Colarossi & Eccles, 2003; Johnson *et al.* 2011) and higher levels of support from peers (Kerr *et al.* 2006), friends and significant others (Canty-Mitchel & Zimet, 2000). Similarly, amongst populations of YPwO, relative to male YPwO, female YPwO report more support from friends and extended family, and less support from parents (Johnson *et al.* 2011). A study reporting on social support amongst young people identified as anti-social, found that females had more peers, fewer delinquent peers, and greater attachment to their peers than males (Moffitt *et al.* 2001). Age or life course developments may affect gender differences in social support, whereby adult females are found to have stronger relationships with family than males (Giordano *et al.* 2002).

1.4.4.3 *Social support and sociocultural factors*

Sociocultural variations have also been found in the nature, values and dynamics of social support and support seeking (Adams & Plaut, 2003; Thompson *et al.* 2006). For example, African-Americans have been found to be less likely to seek support from mental health service providers, but more likely to seek support from religious organizations (Padgett *et al.* 1994). Furthermore, individuals of Asian background have been found less willing to seek social support for dealing with stressful life events (Taylor *et al.* 2004) and benefit more psychologically and biologically from implicit, as opposed to explicit, social support than European Americans, possibly because these cultures value social relationships and group solidarity more than individual needs (Kim *et al.* 2006; Taylor *et al.* 2007). However, critics note that variations in social support are likely to extend beyond basic categories of race/ethnicity and also include factors such as language proficiency, language preference, recency of immigration, level of acculturation and community ethnic density (Mulvaney-Day *et al.* 2007; Turney & Kao, 2009).

Community identity, regardless of ethnicity, may also affect social support. For example, in writing about offending in context of community integration, Braithwaite (1989) emphasised how regions differ in the extent to which individuals are interdependent. Furthermore, time, the nature of communities and access to environmental structures are still likely to mediate relationships and perceived availability of social support (Leach, 2015). Having said that, the current nature of the social world has made geographical proximity less of a requirement for building, maintaining and accessing socially supportive relationships (Allan, 2001; Leach, 2015). On the other hand, factors such as socioeconomic status, culture and geographical location are likely to affect the accessibility of virtual social networks.

1.4.5 Social support and young people who offend

1.4.5.1 *Theoretical perspective: The Social Support Paradigm*

Drawing on research proposing the connection between social support and attachment, stress-buffering, developmental trajectory and relationships, Cullen (1994) offers a Social Support Paradigm in the study of offending behaviour. Cullen (1994) proposes that offending stems from a lack of received and perceived social support and, on the flipside, that the likelihood of engaging in offending behaviour is reduced when providing and receiving social support. Colvin *et al.* (2002) build on Cullen's theory by emphasizing the importance of consistency of support. Indeed, research with YPwO has revealed high levels of social support needs (Chitsabesan *et al.* 2006; King *et al.* 2014) and social support is reported to significantly reduce the risk of offending and to improve the success integration following detention (Griffiths *et al.* 2007; Wilkinson, 2005).

1.4.5.2 *Summary of social support research with YPwO*

Despite the significance of social support, there is limited research on the effect it may have on offending behaviour. There are reports that whilst YPwO are detained, nonparent family members, especially siblings and extended family (Johnson *et al.* 2011), social support from friends and prison staff (Biggam & Power, 1997), visits from parents (Monahan *et al.* 2011) and emotional and practical peer support (Bagnall, 2015), significantly reduce young people's experience of psychological distress.

Social support is also pivotal to successful community re-integration (James *et al.* 2013; La Vigne *et al.* 2004; Mears & Travis, 2004; Wilkinson, 2005), with reports that family ties can increase emotional well-being and reduce housing and employment issues (Ministry of Justice (MoJ), 2008; MoJ and Department for Children, Schools and Families, 2009; Caldwell *et al.* 2004) and general social support, alongside mental and physical health support, can reduce mortality rates (Coffey *et al.* 2004). However, YPwO residing in the community have significantly higher unmet social support needs than those residing in secure settings (Chitsabesan *et al.* 2006; YJB, 2005). YPwO residing in the community are most likely to seek and receive support from people with whom they have a long-standing relationship and YOT's are a less preferred source of support, not as a result of a lack of provision, but because of psychological, social, structural and cultural barriers, such as issues of understanding, stigma and confidentiality (Walsh *et al.* 2011). Similarly, King *et al.* (2014) reported that YPwO residing in the community found formal support-seeking helpful, but that a damaged self, complexity of relationships and internal conflict acted as barriers to seeking social support. King *et al.* (2014) also reported that YPwO appeared to present with emotional skill difficulties, which may be an additional barrier to support seeking behaviour.

Social support can also have negative outcomes for YPwO, as emphasised in the Relationship Perspective (see section 1.4.3.3) and Cullen's Social Support Paradigm of offending (see section 1.4.5.1), with context, source and dimensions of support, especially qualities possessed by those providing support, affecting outcome (Leach, 2015). For example, Martinez & Abrams (2013) report socially supportive family members of YPwO had unrealistic expectations, and peers provided temptations and opportunities to re-offend. Similarly, Salvatore & Markowitz, (2014) report that friendships were significantly related to higher offending rates for YPwO. Such findings might be attributed to social support being erratic and unpredictable in nature (Colvin *et al.* 2002) and support networks being criminally embedded (Clear *et al.* 2001), supporting young people to gain knowledge, skills, role models and social status that promote offending behaviours (Cullen, 1994).

1.4.5.3 *Summary*

Despite the significance of social support, little research has examined the impact of social support on offending behaviour. Research predominantly indicates social support to be a protective factor, although negative relationships have been proposed to increase offending behaviour and YPwO appear to experience a number of personal and sociocultural barriers to accessing and using social support for positive outcomes. Salvatore & Markowitz (2014) recommend further research to investigate the relationship between social support and offending behaviour. Thus, building on the gaps and limitations identified, and the observation made by King *et al.* (2014) that emotional skill deficits might be a possible barrier to social support amongst YPwO, the current study will measure informal perceived social support with YPwO and analyse its relationship with emotional recognition.

1.5 Emotion Recognition and Social Support

The process by which social support exerts benefits remains not fully understood (Johnson *et al.* 2011; Tanzer *et al.* 2013) and this has led researchers to consider the importance of examining psychological resources as mediators between social support and well-being (Chen & Feeley, 2012). Emotion recognition might support the positive outcome of social support, as capacity to recognise and understand emotions lies at the heart of healthy social relationships (Oately, 2004). Indeed, recognising and sharing emotion has been suggested as being essential to the development of friendships, support, and intimacy (Fitness, 2006; Spitzer *et al.* 2005) and difficulty in interpersonal relationships may result in problems in expressing emotions and reliably labelling others' emotions (Spitzer *et al.* 2005). The majority of research examining the relationship between social support and emotion recognition has measured alexithymia, as opposed to the recognition of others' emotions.

1.5.1 Alexithymia and social support

Nearly three decades ago, it was suggested that alexithymia might be associated with reduced social support, because of a lack of emotional understanding and expression (Kirmayer, 1987). A review of the literature identified a number of more recent studies which examine the relationship between alexithymia and social support.

Lumley *et al.* (1996b) were the first to report on social support and alexithymia from their study of over 900 participants aged 16-67. Analysis revealed that alexithymia (especially difficulty identifying and describing feelings) was related to fewer relationships and lower levels of perceived support. These findings should be interpreted cautiously however, as a large number of analyses were completed with relationships being of limited significance. Having said that, Posse *et al.* (2002) reported similar findings, whereby participants scoring ≥56 on the TAS-20, were 3.5 times more likely to report low levels of perceived social support (social support scores consisted of high, moderate, low, none), than participants with TAS-20 scores of ≤55. This study did not report any statistical analysis of the relationships between social support and TAS-20 subscale scores. Kojima *et al.* (2003) also reported a significant negative correlation between alexithymia scores and work-related social support.

Amongst adolescents aged 16-19, Ciarrochi *et al.* (2002) reported a relationship between alexithymia and low intention to seek social support. In explanation, Thompson *et al.* (2006) suggest that young people with adverse life experiences who are in emotional turmoil may be less capable of viewing other people as sources of available support. In 2008, Ciarrochi *et al.* reported on a study which measured alexithymia and friendships from 8th grade (age 12) every 12 months for four years. Findings showed that i) female alexithymia scores correlated significantly with numbers of female, but not male, friendships and ii) males showed no link between alexithymia and number of friendships. In explanation, emotional skills are thought to affect networks and use of social support differently, with female friendships relying more heavily on emotional content, emotional expressiveness and intimacy (Bryant, 1994; Olson & Shultz, 1994), and male friendships emphasising engagement in activities (Crick, 1995). However, this study only measured socially supportive friendships and did not consider, for example, parental or family relationships, which males, as opposed to females, perceive as more supportive (Colarossi & Eccles, 2003; Johnson *et al.* 2011).

Measuring perceived availability and quality of social support using the MSPSS in a study of over 700 young people aged 17-21, Karukivi *et al.* (2011) report that perceived social support (total and subscale scores) was significantly correlated with alexithymia (total score and subscales of difficulty identifying and describing feelings). Furthermore low perceived social support from friends was most significantly correlated with alexithymia and externally oriented thinking was also significantly correlated with perceived social support, although only amongst female participants. Repeating the same measures four years later with the same participants, led to a report that only low perceived social support from friends remained significantly correlated with TAS-20 scores (Karukivi *et al.* 2014).

In terms of the generalisability of these findings, all studies were non-UK based (America, Australia, Japan and Finland) and participants consisted of secondary school and college students, professional workers and patients with chronic health conditions, all predominantly female (with the exception of Kojima *et al.* 2003). Furthermore, very few studies reported controlling for potentially confounding variables, and all used self-report measures, including a mixture of perceived social support measures.

1.5.2 Facial emotion recognition and social support

FER is proposed to play an important role in nonverbal communication and social interaction (Stone & Nielsen, 2001; Erickson & Schulkin, 2003). Indeed, in a systematic review of FER in the field of child psychiatry, Collin *et al.* (2013) concluded that FER impacts on social functioning and peer relationships, with deficits likely to have a negative effect on these relationships. However, in a study with participants aged 19-26, Tanzer *et al.* (2013) found that perceived social support was negatively correlated with FER of anger and positively correlated with FER of happiness. In support of these findings, it has been suggested that higher levels of social support are associated with decreased recognition of negative emotions, because perceived support might lead to appraisal of potential threats as being less stressful (Schnall *et al.* 2008). However, several methodological limitations, suggest findings should be interpreted cautiously. For example, the study only explored FER of happy and angry expressions, making it difficult to ascertain whether perceived social support decreases recognition of all negative emotions, or only of anger. Secondly, FER testing took place under induced stress, with the aim of supporting the stress-buffering model, but the experiment did not include a control group which did not experience manipulation. Furthermore, participants included female Psychology students only. Lastly, with the exception of depressive symptoms, the study did not control for social support confounding variables, such as self-esteem (Kaul & Lakey, 2003) and attachment styles

(Bartholomew *et al.*, 1997; Ma, 2006) or emotion recognition confounding variables, such as anxiety (Karukivi *et al.* 2010; Richards *et al.* 2002) or attachment styles (Niedenthal *et al.* 2002).

1.5.3 Section summary

To date, we have been unable to identify a study that considers the relationship between emotion recognition and perceived social support with YPwO in a British context, highlighting the need for the current study. Yet, despite the noted limitations, findings of adult and adolescent studies consistently indicate a significant relationship between alexithymia and perceived social support and FER and perceived social support. Although cross-sectional studies limit interpretation of causality, findings that alexithymia might be associated with reduced social support (Kirmayer, 1987), are thought to be attributable to low emotional and social skills making relationship development difficult (Kojima *et al*. 2003; Lumley *et al.* 1996b). The current study aims to build on the above research findings, by being the first study to measure both emotion recognition and perceived social support in a British sample of young people (who offend), including males and females, whilst controlling for confounding variables such as age, gender and socioeconomic status. It is hoped that these findings will help inform future research and social-emotional interventions for young people who have offended or might offend.

1.6 Systematic Review

1.6.1 Review methodology

An initial review of the literature using all the search terms (see Appendix A) relating to emotion recognition, social support and offending behaviour was carried out to establish whether a similar study had been carried out with YPwO. The literature review helped establish that although research has been completed in relation to social support and emotion recognition with adolescent samples, no research had apparently examined social support and emotion recognition in YPwO (although King *et al.* 2014 do raise the hypothesis that difficulty relating to emotions may be a barrier to YPwO seeking support). Furthermore, the literature review only identified two studies examining social support and YPwO with a *community* sample of YPwO (King *et al.* 2014; Wright *et al.* 2011). King *et al.* (2014) explored the perceptions of support seeking of YPwO in a qualitative study and Wright *et al.* (2011) examined mental health support of YPwO in a mixed methods study. Other articles report on social support and YPwO whilst detained or during rehabilitation.

Considering the lack of relevant literature relating to social support and YPwO, and the fact that no literature was found that examined social support *and* emotion recognition in YPwO, the decision was made to conduct a systematic literature search in order to answer the question most closely relating to the current research topic: *"Do YPwO show lower ability to recognize emotions than young people without a known offending history?"*

On 31st December 2015 a review of the clinical research evidence was conducted using the following databases: Cardiff University Full Text Journals, AMED, EMBASE (up to December 30 2015), Ovid Medline (up to November week 3 2015), Psycarticles Full Text and Psycinfo (up to December week 4 2015). Search terms, Emotion recogn* **OR** Affect recogn* **OR** Emotion misrecogn* **OR** Affect misrecogn* **OR** Alexithymia **AND** you* offend* **OR** delinq* **OR** criminal were used, which returned N = 188 after removal of duplicates.

The titles of 188 studies were reviewed. Studies where it was clear that the researchers had not measured the relationship between offending and emotion recognition were discarded. The 68 remaining titles and abstracts were assessed against the following inclusion and exclusion criteria. Studies were included if they comprised an empirical study of primary data and studied the relationship between offending and emotion recognition in participants aged 11-21 known to have committed offences. Dissertations, conference abstracts without availability of full paper, articles unavailable in English and intervention studies were also excluded. Studies where participants were selected specifically for mental health diagnosis (for example, conduct disorder, psychopathy, borderline personality disorder) and did not conduct analysis of emotion recognition of participants with and without offending histories were also excluded.References of the full text articles retrieved were also checked for relevant studies. A flow chart depicting the selection process of studies included in the systematic review can be found in Figure 1.7.

Eleven studies remained and were included in the systematic review. A summary of the identified studies is presented in Table 1.2 followed by a narrative description and critical review of the quality of research (using The STROBE checklist for cross-sectional studies (von Elm *et al.* 2008) (see Appendix B). The STROBE checklist was also used to derive a quality score for each reviewed study (see Appendix B). Some reviewed studies report on variables such as attachment or psychopathic traits which, for the purposes of this review, will not be reported here; only findings relating to emotion recognition and offending behaviour are reported.

Figure 1.7: Flowchart of the systematic review study selection process

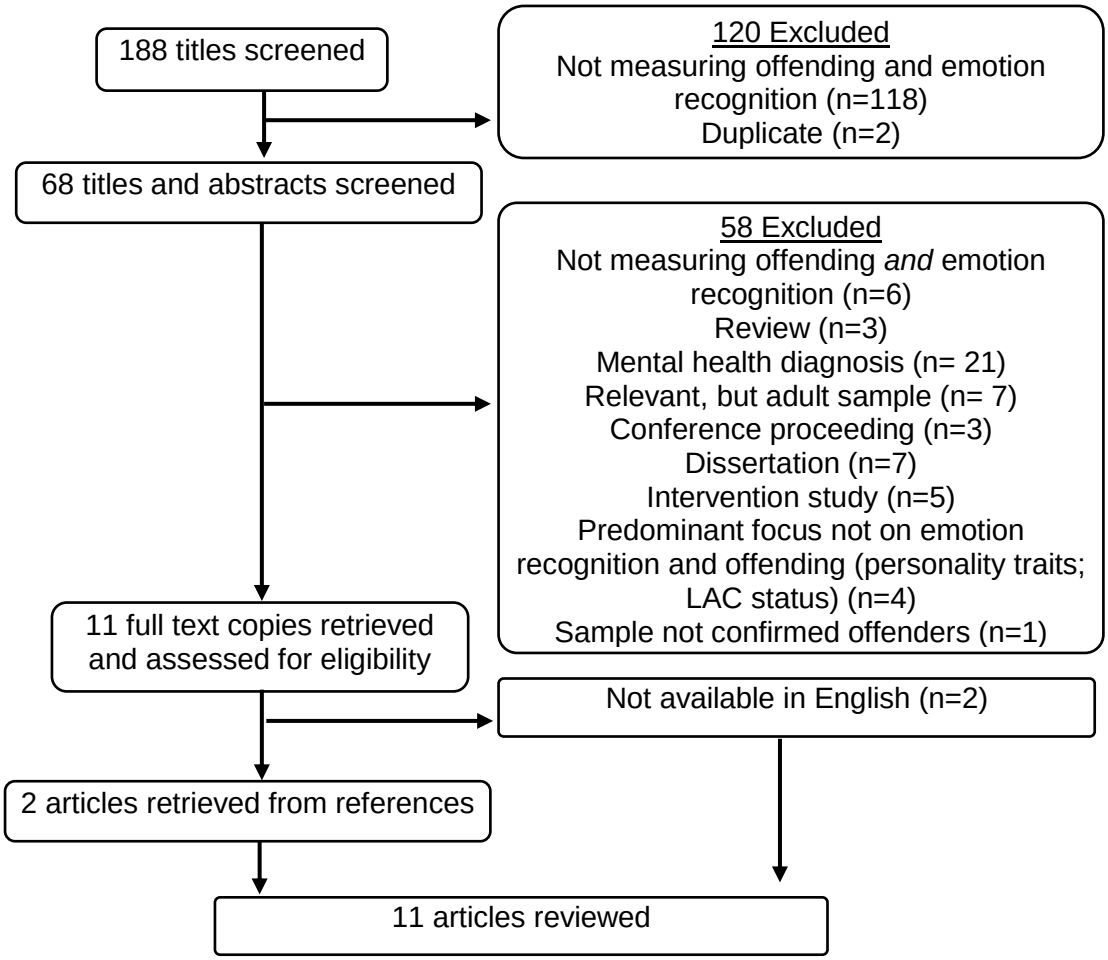

188 titles screened
120 Excluded
Not measuring offending and emotion recognition (n=118)
Duplicate (n=2)
68 titles and abstracts screened
58 Excluded
Not measuring offending *and* emotion recognition (n=6)
Review (n=3)
Mental health diagnosis (n= 21)
Relevant, but adult sample (n= 7)
Conference proceeding (n=3)
Dissertation (n=7)
Intervention study (n=5)
Predominant focus not on emotion recognition and offending (personality traits; LAC status) (n=4)
Sample not confirmed offenders (n=1)
11 full text copies retrieved and assessed for eligibility
Not available in English (n=2)
2 articles retrieved from references
11 articles reviewed

Table 1.2: Summary of systematic review of studies examining relationship between emotion recognition ability and offending behaviour in YPwO

Study and q. score	Sample				Method	Measures	Key findings	Key limitations
	n and type	Gender	Mean Age (SD), years	Country				
Alexithymia studies								
Moriarty *et al.* (2001) **41.7%**	15 community YPwO on Male Adolescent Programme for Positive Sexuality (MAPPS) 49 age and gender matched controls	Male	YPwO 16.93 (1.79) Controls 15.24 (1.07) Age range 14-17	Australia	Aim: Comparison of emotional intelligence Design: Cross-sectional Analysis: ANOVA and discriminant analysis	• TAS-20 • TMMS • IIP-32 • IRI	• YPwO reported higher scores in TAS-20 than controls, but this was not statistically significant • Relative to controls, YPwO reported significantly higher scores on the TMMS attention to feelings and significantly higher scores on the IIP-32 'too aggressive' domain.	• Small sample size, limited to male YPwO with sexual offences only • No measure of IQ, education or verbal intelligence and doesn't control for confounders (especially counselling and non-counselling in YPwO and controls not screened for offending) • Control group not matched for demographic factors • Uses measure of alexithymia to test recognition of others' emotion • No subgroups identified • No clear incl./excl. criteria • No report of participant ethnicity or nationality • No report of recruitment methods
Möller *et al.* (2014) **50.0%**	42 imprisoned YPwO	Male	YPwO 20.1 (0.7) Age range 18-21	Sweden	Aim: Mentalizing ability in YPwO Design: Cross-sectional Analysis: correlations and t-test	• TAS-20 • AAI • PCL: SV • Reflective functioning crime specific	• Relative to non-violent offenders, violent offenders scored higher on TAS-20 (not significantly) • The TAS mean score did not exceed cut-off for alexithymia, but higher than expected.	• Modest sample size, limited to imprisoned adolescent males • No control group • No measures of IQ, verbal ability and no report of demographic or confounding variables • Participant stress- response bias • No exclusion criteria. • No report of participant ethnicity or nationality
Zimmermann (2006) **62.5%**	36 YPwO in inpatient residential facilities 46 age and gender matched controls	Male	YPwO 16.10 (1.02) Controls 15.95 (0.80) Age range 14-18	Switzerland	Aim: Correlation between alexithymia, anxiety, FFM and offending Design: Cross-sectional Analysis: t-tests, correlations and regressions	• TAS-20 • R-CMAS • LABEL	• YPwO scored significantly higher than controls on TAS-20 (*t* (80)=3.14, p<.0125) and TAS-DIF (*t* (80)=2.89, p<.0125) • Significantly more alexithymics in YPwO (47.2%) than control group (21.7%) (p<.05).	• Limited to male YPwO in inpatient facilities • Family disruption possibly over-represented • No subgroups identified • No mention of consent, although compliant with code of Swiss Society of Psychology • No measure of IQ or verbal ability • No clear incl./excl. criteria • Controls not screened for offending • No report of recruitment methods

Study and q. score	Sample				Method	Measures	Key findings	Key limitations
	***n* and type**	**Gender**	**Mean Age (SD) (years)**	**Country**				
Studies examining recognition of others' emotions								
McCown *et al.*(1986) **25.0%**	40 YPwO from medium secure facility 40 gender matched controls	Male	YPwO: 15.4 Age range: 13-16 Controls: 14.89 (1.6)	United States	Aim: Facial emotion recognition in YPwO relative to controls Design: Cross-sectional Analysis MANOVA and ANOVA	FER task	• YPwO scored significantly lower than controls in FER ($F(6,73)=2.88$, $p<.05$) • YPwO scored significantly lower on surprise ($F(1,78)=12.24$, $p<.05$). • Between group difference for FER sadness and disgust was reported as significant, but p=.05).	• All male participants from medium secure correction facility • No offending information of YPwO • No subgroups identified • Control group were high risk adolescents, but not reported to be screened for offences • Age range of controls not reported • Did not measure verbal IQ, LAC status or SES as such and no consideration of confounding variables • No mention of consent or other ethical procedures (incentive for YPwO but not controls) • Reports significance when p = 0.5 • No reported limitations
McCown *et al.* (1988) **33.3%**	84 YPwO from residential detention facility No report of control group size	Male	YPwO 14.21 (1.32) Controls 14.82 (1.32)	United States	Aim: Direction FER error in YPwO, relative to controls Design: Cross-sectional Analysis MANOVA and t-tests	FER task	• No significant differences in total FER errors between YPwO and controls (adjusted df=107.8)=-.87, p<.40). • Within YPwO group variance in FER errors so big between group comparison is tempered. • Relative to controls, 59% more YPwO made fewer FER errors.	• Restricted to white males from detention facility • No offending information of YPwO • Unspecified number in control group • No information regarding participant age range • No information regarding consent or other ethical procedures (incentive for YPwO but not controls) • No report of recruitment methods • Did not measure verbal IQ, LAC status or SES as such and no consideration of confounding variables • No subgroups identified • Control group not screened for offences • Facial expressions shown twice for restricted time of 0.5 seconds • Within YPwO group variance in FER errors so between group comparison tempered

Study and q. score	Sample				Method	Measures	Key findings	Key limitations
	***n* and type**	**Gender**	**Mean Age (SD) (years)**	**Country**				
Studies examining recognition of others' emotions								
Savitsky & Czyzewski (1978) **50.0%**	20 YPwO from a detention centre 36 controls from school	Male	YPwO 16.45 Controls 16.69 Age range: 16-17 years	United States	Aim: compare YPwO and controls' FER ability Design: Cross-sectional Analysis: t-tests, ANOVA and correlations	• The Quick Test • ELT • ERT	• Initial t-tests showed YPwO were less accurate than the control group in FER ($t(54)=2.46$, $p<.02$), but this difference was no longer statistically significant when controlling for verbal intelligence scores (verbal ability was significantly correlated with FER ($p<.05$).	• Limited to relatively small, male sample • No mention of matching groups for age • Did not use robust, recognised measures for FER • Did not measure LAC status or SES • No report of participant inclusion/exclusion criteria • No report of recruitment methods • No subgroups identified
Jones *et al.* (2007) **50.0%**	15 YPwO from youth offending institute 22 gender and age matched controls	Male	YPwO 16.10 (9.30) Controls 17.3 (6.71) Age range: 15-18	England (UK)	Aim: assess social cognitive deficits in YPwO Design: Cross-sectional Analysis t-tests, ANOVA, MANOVA, MANCOVA	• WASI • SASI (incl. FER task) • YSR	• Relative to controls, YPwO scored significantly lower on FER of anger ($F=8.11$, $p<.01$), fear ($F=7.10$, $p<.05$) and disgust ($F=9.64$, $p<.01$). When controlling for verbal intelligence variable, YPwO scored significantly lower on anger ($F=8.11$, $p=.05$) and disgust ($F=9.64$, $p<.05$).	• Limited to small, male sample • No offending information of YPwO • Demographics: did not measure LAC status or SES • Incorrectly claims no previous studies have examined emotion recognition with YPwO • No comment on participant ethnicity or nationality • Controls not screened for offending • No inclusion/exclusion criteria • No comment on consent process for participants <16 years or other ethical procedures • No report of recruitment methods • Doesn't report number of photos presented in FER task • No subgroups identified • Reports significance when p = 0.5

Study and q. score	Sample				Method	Measures	Key findings	Key limitations
	n and type	Gender	Mean Age (SD) (years)	Country				
Studies examining recognition of others' emotions								
Carr & Lutjemeier (2005) **60.0%**	29 YPwO from probation detention centre	Male	YPwO 15.3 Comparison group 11-17 years Age range 11-17	United States	Aim: Relationship between FER, Empathy and delinquency Design: Cross-sectional Analysis: t-tests and correlations	• DANVA2-AF • DANVA2-CF • IECA • SRDQ	• Overall FER recognition scores were lower for YPwO than controls, but this was not significant. YPwO aged 11-12 years reported significantly more errors in FER for adults faces than the control group ($t(3)=5.8$, $p<.01$) • Significant negative correlation between FER scores of child faces and violent offences ($r=-.47$, $p<.05$) • Significant positive correlation between FER anger scores and offending ($r=.38$, $p<.05$) and theft offences ($r=.43$, $p<.05$)	• Small sample size, limited to males • Used a normative study as comparison group • No measure or description of demographic information relating to SES, IQ, LAC status, education or verbal intelligence • No description of matching YPwO and normative groups in terms of age, gender and other relevant demographics • No subgroups identified • No clear inclusion/exclusion criteria • Significant difference in FER recognition aged 11-12 years was based on comparison of 4 YPwO to 286 comparison study controls • Controls not screened for offending
Sato *et al.* (2009) **61.5%**	24 imprisoned YPwO 24 age and gender matched controls	Male	YPwO 18.3 (1.3) Controls 17.4 (3.5)	Japan	Aim: investigate FER in YPwO Design: Cross-sectional Analysis: t-tests, MANOVA and MANCOVA	• FER task	• Overall, participants were more able to accurately respond to Caucasian than Japanese stimuli ($F(1,46) = 8.96$, $p<.05$). • Overall, happy and surprised expressions were easiest to recognise, followed by sad and angry followed by fear and disgust. • YPwO were less accurate than controls in FER of disgust ($F(1,46)=8.93$, $p<.05$).	• Limited to relatively small, male sample • Participant age range not reported • Did not measure LAC status or SES as such • Age range no reported • Inclusion/exclusion criteria not reported • Controls not screened for offending

Study and q. score	Sample				Method	Measures	Key findings	Key limitations
	***n* and type**	**Gender**	**Mean Age (SD) (years)**	**Country**				
Studies examining recognition of others' emotions								
Gonzalez-Gadea *et al.* (2014) **62.5%**	30 YPwO from a reform school 16 controls	Male	YPwO: 16.67 (0.54) Controls: 16 (0.63) Age range 15-18	Columbia	Aim: Emotion recognition and empathy in YPwO relative to controls Design: cross-sectional Analysis: t-test, ANOVA, ANCOVA and multiple regressions	• FER: EMT • TASIT-EET • DVAT • IRI • EPT • RSPM • IFS	• No significant difference in emotion recognition according to IQ • YPwO scored significantly lower on FER: EMT than controls (p<.001)→ not significant when controlling for age and education p>.05). • YPwO scored significantly lower than controls in context-sensitive measures of emotion recognition (p<.001).	• Small sample size • All males • Did not measure verbal IQ, LAC status or SES • No comment on participant ethnicity or nationality • Controls not screened for offending • No report of recruitment methods • No subgroups identified
Bowen *et al.* (2013) **69.2%**	63 male community YPwO 37 age, gender, IQ and socio-economic status-matched controls	Male	YPwO 15.79 (.8) Age range 13-17 Controls 15.41(1.1)	Wales (UK)	Aim: Examine emotion recognition dysfunction in YPwO, relative to controls Design: Cross-sectional Analysis: t-tests, repeat measure MANOVA's, correlations (and multiple regressions related to callous unemotional traits and FER)	• FER task with emotion intensities • WASI • YPI • YSR • Offence data • Socio-economic status	• YPwO were significantly worse at identifying sadness (p<.05), low intensity anger (p<.05) and high intensity fear (p<.05). • YPwO with high severity offences were significantly worse at identifying low intensity anger (p<.05), but significantly better at recognising high intensity anger (p<.05)	• Limited to males • Doesn't report age range of control group • No measure of LAC status • No subgroups • No clear excl. criteria • No comment on participant nationality or ethnicity • Controls not screened for offending • Compared between group difference on IQ (not significant), but not vocabulary/ verbal IQ in isolation.

AAI: Adult Attachment interview (George *et al.* 1985); **CERT:** Cartoon Emotion Recognition Test (Carr & Lutjemeier, 2005); **DANVA2-AF:** The Diagnostic Analysis of Nonverbal Accuracy 2- Adult Facial Expressions Test (Nowicky, 2001; Nowicky & Duke, 1994); **DANVA2-CF:** The Diagnostic Analysis of Nonverbal Accuracy 2- Child Facial Expression Test (Nowicky, 2001; Nowicky & Duke, 1994); **DVAT:** Dual Valence Association task (Ibanez *et al.* 2011); **ELT:** Emotion Labelling Task (Savitsky & Czyzewski, 1978); **ERT:** Emotion Reaction Task (Savitsky & Czyzewski, 1978); **EPT:** Empathy for Pain task (Decety *et al.* 2012); **FER task:** Facial Emotion Recognition task (Ekman & Friesen, 1976); **FER EMT:** Facial Emotion Recognition Emotional morphing task (Ekman & Friesen, 1976; Young *et al.* 1997); **FFM:** Full Factor Model of personality (Digman, 1990); **IFS:** Frontal Screening Test (Torralva *et al.* 2009); **IECA:** Index of Empathy for Children and Adolescents (Bryant, 1982); **IRI:** Interpersonal Reactivity Index (Davis, 1983); **IIP-32:** Inventory of Interpersonal Problems (Barkham *et al.* 1996); **LABEL:** Liste d'Adjectifs Bipolaires et en Echelles de Likert (Gendre & Capel, 2003; Gendre *et al.* 2002); **PCL:SV:** Psychopathy Checklist Shortened Version (Frodi *et al.* 2001; Vitacco *et al.* 2008); **R-CMAS**: Revised Children's Manifest Anxiety Scale (Reynolds& Richmond, 1985); **RSPM:** Raven's Standard Progressive Matrices (Raven *et al.* 2008); **SASI:** Schedules for the Assessment of Social Intelligence (Skuse *et al.* 2005); **SRDQ:** Self-reported Delinquency Questionnaire (LeBlanc & Fruchette, 1989); **TMMS:** Trait Meta-Mood Scale (Salovey *et al.* 1995); **TAS-20:** Toronto Alexithymia Scale (Bagby *et al.* 1994); **TASIT-EET:** The Awareness of Social Inference Test (McDonald *et al.* 2006); The Quick Test (Ammons & Ammons, 1962); **WASI:** Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999); **YPI:** Youth Psychopathy Inventory (Andershed *et al.* 2001); **YSR:** Youth Self Report (Achenbach, 1991).

1.6.2 Study introductions and hypotheses

As recommended by Vandenbroucke *et al.* (2007), all articles provided good quality abstracts and introductions with a description of the rationale for the research based on existing scientific knowledge and hypotheses that were clearly stated. All studies hypothesised that YPwO will show or report deficits in emotion recognition in comparison to non-offending controls or that there would be a negative correlation between emotion recognition and offending behaviour. Two studies predicted that emotion recognition deficits would be more pronounced for some emotions (Bowen *et al.* 2013; Sato *et al.* 2009), hypothesising that YPwO would display deficits in recognition of fear and sadness in comparison with controls, but would show no difficulty in recognising positive emotions (Bowen *et al.* 2013). Further specific hypotheses included that (i) alexithymia would better differentiate YPwO from controls than personality or demographic variables (Zimmermann, 2006), (ii) YPwO will be more likely to mislabel positive and neutral emotions as negative (McCown *et al.* 1986) and iii) there would be a bias towards misinterpretation of emotions as anger (Sato *et al.* 2009).

1.6.3 Samples

1.6.3.1 *Sample setting and locations*

Information relating to sample setting and locations are essential in evaluating the context and generalizability of a study's results (Vandenbroucke *et al.* 2007). All studies reported sample setting and locations. The majority of studies (10) recruited the YPwO samples from secure detention facilities including prison, reform schools, residential detention centres and youth offending institutes (Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; McCown *et al.* 1986, 1988; Möller *et al.* 2014; Sato *et al.* 2009; Savitsky & Czyzewski, 1978; Zimmermann, 2006), whilst two studies included community YPwO samples (Bowen *et al.* 2013; Moriarty *et al.* 2001). All studies except two (Carr & Lutjemeier, 2005; Möller *et al.* 2014) employed control groups. Control samples were mostly recruited from educational settings, such as secondary schools (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; McCown *et al.* 1988; Moriarty *et al.* 2001; Savitsky & Czyzewski, 1978; Zimmermann, 2006), colleges (Jones *et al.* 2007) and youth establishments (Bowen *et al.* 2013) with one study recruiting controls through advertisement (Sato *et al.* 2009) and one study recruiting controls through a children's camp programme for young people at high risk of deviancy (McCown *et al.* 1986).

In terms of sample locations, four studies were completed in the United States (Carr & Lutjemeier, 2005; McCown *et al.*, 1986, 1988; Savitsky & Czyzewski, 1978), one in Australia (Moriarty *et al.* 2001), one in Japan (Sato *et al.* 2009), one in Sweden (Möller *et al.* 2014),

one in Switzerland (Zimmermann, 2006), one in Columbia (Gonzalez-Gadea *et al.* 2014) and two in the United Kingdom (Bowen *et al.* 2013; Jones *et al.* 2007).

Six studies reported that they had recruited controls and YPwO from the same geographical area (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; McCown *et al.* 1986, 1988; Zimmermann, 2006). Three studies documented settings of recruitment but not whether participant groups were recruited from similar geographical locations (Moriarty *et al.* 2001; Sato *et al.* 2009; Savitsky & Czyzewski, 1978). As noted, the remaining two studies did not include a control group (Carr & Lutjemeier, 2005; Möller *et al.* 2014), nor did they report geographical area of YPwO samples.

1.6.3.2 *Sample size*

Sample size and statistical power need to be considered in evaluating the validity and reliability of observational studies (Vandenbroucke *et al.* 2007). In critique, with the exception of one study (Zimmermann, 2006), all studies reviewed did not indicate how the study sample size was calculated or arrived at, and only one study described numbers of participants that were eligible at each stage of the research (Carr & Lutjemeier, 2005). Overall sample sizes were modest, and varied considerably, with overall sample sizes ranging from 29 to 100 participants.

YPwO group sample sizes ranged from 15 (Jones *et al.* 2007; Moriarty *et al.* 2001) to 84 (McCown *et al.* 1988), with six studies including YPwO groups of ≤30 (Carr & Lutjemeier, 2005; Jones *et al.* 2007, Gonzalez- Gadea *et al.* 2014; Moriarty *et al.* 2001; Sato *et al.* 2009; Savatisky & Czyzewski, 1978). Control group sample sizes ranged from 16 (Gonzalez-Gadea *et al.* 2014) to 49 (Moriarty *et al.* 2001). McCown *et al.* (1988) did not specify the size of their control group. Control groups were bigger than the YPWO group in four studies (Jones *et al.* 2007; Moriarty *et al.* 2001; Savitsky & Czyzewski, 1978; Zimmermann, 2006), smaller in two studies (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014) and the same size in two studies (McCown *et al.* 1986; Sato *et al.* 2009). Of all studies reviewed, only Zimmermann (2006) reported sample size rationale.

1.6.3.3 *Offence data*

For the YPwO groups, four studies reported no offence data (McCown *et al.* 1986; 1988; Jones *et al.* 2007; Sato *et al.* 2009), five studies reported the YPwO sample had committed a range of offences (Bowen *et al.* 2013; Carr & Lutjemeier, 2005; Möller *et al.* 2014; Savitsky & Czyzewski, 1978; Zimmermann, 2006) and two studies included specific YPwO samples, including sexual offences only (Moriarty *et al.,* 2001) or robbery (65%) and murder (35%)

offences only (Gonzalez-Gadea *et al.* 2014). Six studies reported specific (different) offence data, and one study reported that YPwO were on MAPPS court orders, but provided no further offence data relating to number of arrests, offences or detentions (Moriarty *et al.* 2001). Specific offence data included offence severity (Bowen *et al.* 2013), frequency of arrests, ranging from at least twice (Savitsky & Czyzewski, 1978) to an average of 7.28 (Zimmermann, 2006), frequency of offences (Carr & Lutjemeier, 2005), frequency of imprisonment (average of 3.95 incarcerations) (Savitsky & Czyzewski, 1978), and sentence length ranging from 2-12 months (Carr & Lutjemeier, 2005) to an average of 19 months (Möller *et al.* 2014) to 4-48 months (Gonzalez-Gadea *et al.* 2014). Of the six studies reporting offence data, two did not document how this information was retrieved (Möller *et al.* 2014; Zimmermann, 2006), two studies retrieved the information through self-report scales (Carr & Lutjemeier, 2005; Savitsky & Czyzewski, 1978) and two studies retrieved the information from file notes (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014).

1.6.3.4 *Eligibility criteria*

Apart from age and gender, most studies (N = 8) did not report on specific eligibility criteria (Carr & Lutjemeier, 2005; Jones *et al.* 2007; McCown *et al.* 1986, 1988; Moriarty *et al.* 2001; Sato *et al.* 2009; Savitsky & Czyzewski, 1978; Zimmermann, 2006). Bowen *et al.* (2013) and Möller *et al.* (2014) comment on YPwO inclusion criteria, but no other YPwO or control (Bowen *et al.* 2013) eligibility criteria. Whilst this may be because participants were not excluded for any reason, this was not made explicit. Gonzalez- Gadea *et al.* (2014) was the only study to report on sample inclusion and exclusion criteria. Furthermore, it seems that an assumption was made that all control samples had not committed offences;- only one study explicitly reported the control group had not been arrested or detained (Savitsky & Czyzewski, 1978) and no studies reported whether the control group was screened for offences. As noted, one study recruited a control group considered high risk for deviancy (McCown *et al.*1986), for which a rationale was not provided.

1.6.3.5 *Demographic information*

All papers reported the gender and age of the participants. Average age of participants ranged from 14.21 years to 20.1 years. Considering gender has been proposed to be related to emotion recognition ability (see sections 1.3.4.2 and 1.3.6.2), all studies were limited to only male participants, without providing a rationale for doing do. Moreover, few studies gave detailed information relating to other potentially confounding demographic data and four studies reported no additional demographic information at all (McCown *et al.* 1986, 1988; Möller *et al.* 2014; Moriarty *et al.* 2001).

In light of the suggested relationship between socio-economic status (SES) and emotion recognition (see 1.3.6.5), only two studies measured participant SES (Bowen *et al.* 2013; Zimmermann, 2006), although both studies measured variations of this (participant post-codes and parent occupations). Furthermore, five studies failed to comment on ethnicity or nationality (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; Möller *et al.* 2014; Moriarty *et al.* 2001), only three studies commented on nationality and language (McCown *et al.* 1986; Sato *et al.* 2009; Zimmermann, 2006), only one study commented on ethnicity (Carr & Lutjmeier, 2005) and the older studies commented on whether participants were of 'black' or 'white' background (McCown *et al.* 1986, 1988; Savitsky & Czyzewski 1978). Lastly, no studies reported whether participants could be considered as having 'looked after child' status, also found to be significantly correlated with offending behaviour (Schofield *et al.* 2015).

1.6.4 Methodology/ design

1.6.4.1 *Recruitment*

Well-considered recruitment strategies are crucial to a successful study (Wicks, 2007). Five studies reported on recruitment locations, but did not report specific recruitment methods (Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; McCown *et al.* 1988; Moriarty *et al.* 2001; Savitsky & Czyzewski, 1978). McCown *et al.* (1986) reported the use random sampling and Möller *et al.* (2014) reported the use of opportunity sampling for the YPwO group. McCown *et al.* 1986 did not report recruitment methods of the control group. Sato *et al.* (2009) reported to have recruited the control group through advert, but did not report recruitment methods of the YPwO group. Advert recruitment strategies are critiqued for introducing bias, as those who volunteer in response to adverts have been shown to have a number of different characteristics than non-responders across a range of variables (Dunne *et al.* 1997).

Bowen *et al.* (2013) reported recruitment methods of YPwO and controls. Bowen *et al.* (2013) recruited YPwO using opportunity sampling through case managers and recruited a matched control group using control sampling. This study removed any control group participants with higher SES and IQ than the YPwO group from subsequent analysis. However, Bowen *et al.* (2013) do not report how many participants were eligible at each stage of this recruitment process and this type of recruitment strategy is more likely to be subject to Type II errors than if a larger number of controls were included.

Carr & Luthjemeier (2005) provide the most detailed account of recruitment methods, providing parents/guardians with study information (covering ethical processes) and requesting their consent, also offering a $5 fast food voucher for participation. However, the

study did not comment on how YPwO themselves were engaged or communicated with, whether they volunteered or whether their parents/guardians volunteered on their behalf, meaning that motivational might be limited.

1.6.5 Study design

None of the studies specifically reported the design of the study, although by nature of the studies it could be deducted that all were cross-sectional in nature. Cross-sectional research is limited in that it does not include longitudinal measures of stability and change over time. Therefore, although a relationship between constructs can be identified, a causal effect between them cannot be inferred (Vandenbroucke *et al.* 2007).

1.6.5.1 *Measures*

All studies clearly described the measures used for study outcomes. Of the three studies measuring alexithymia, all used the TAS-20, which is the most widely used robust measure of alexithymia (see section 1.3.3.1 for a review of the TAS). In terms of recognition of others emotions, a greater variety of measures were used, although six out of the eight studies of emotion recognition in others used pictures from the FER task designed by Ekman & Friesen (1976) (Bowen *et al.* 2013; Jones *et al.* 2007; Gonzalez-Gadea *et al.* 2014; McCown *et al*. 1986, 1988; Sato *et al.* 2009).

The FER task has good reliability (Ekman & Friesen, 1976; Frank & Stennet, 2001) and has been used with many different age groups from young children (Uljarevic & Hamilton, 2013) to older adults (Calder *et al.* 2003). Although the FER task is the most widely used robust measure of FER and quick and simple to administer, it is limited to dated and non-context specific photographs and uses adult photographs whilst testing emotion recognition ability of young people (see section 1.3.7.1 and 2.5.4 for further detail). Instead of the FER task, Carr & Lutjemeier (2005) developed and used the CERT and the validated measures, the DANVA2-child and adult versions of facial emotion recognition with colour pictures (although also quite dated). Although Carr & Lutjemeier (2005) reported that the CERT reached good content validity and test re-test stability (r =.82), this was only validated with 15 participants. The DANVA2 adult version has been validated with young persons, evidencing a Cronbach's alpha of .78 (Baum *et al.* 1996) and test-retest reliability of r =.81 (McIntire *et al.* 1997). The DANVA2 child version has been validated with a Cronbach's alpha of .69 to .81 and test-retest reliability of r = .74 (Nowicki, 2001; Nowicky & Carton, 1993).

Gonzalez-Gadea (2014) and Savitsky & Czyzewski (1978) are the only studies which included more context specific emotion recognition measures. Savitsky & Czyzewski (1978) used an Emotion Labelling Task (ELT) developed by the authors, which includes 32 black

and white video-taped vignettes lasting approximately 1 minute. This measure, although reaching a criterion of 88%, was limited to being validated with small sample of 16 undergraduate psychology students. Gonzalez-Gadea *et al.* (2014) used the Emotion Evaluation subtest of the Awareness of Social Inference Test (TASIT-EET) (McDonald *et al*. 2006) and the Dual Valence Association Task (DVAT) (Ibanez *et al.* 2011). The TASIT-EET, a subtest if the TASIT, includes 20 short (15-60 seconds) clips of actors interacting in everyday situations. After viewing each scene, participants are asked to choose (from fear, surprise, sadness, anger and disgust) which emotion was expressed by the main actor. The TASIT has shown to have adequate psychometric properties (Cronbach's alpha of .52-.74 and test-re-test reliability of the emotion recognition subtest of r =.74), and was only evaluated with a small sample of adults (N=32) with traumatic brain injury (McDonald *et al*. 2006). Later studies with clinical (N=179) and non-clinical (N=104) adult samples have also described the TASIT as having fairly weak psychometric properties, including Cronbach's alpha of .76 and test-re-test reliability of r =.54 in a non-clinical sample and Cronbach's alpha of .81 and test-re-test reliability of r = .60 in a clinical sample (Pinkham *et al.* 2016). The DVAT includes pictures of happy and angry faces and pleasant and unpleasant words, presented for 300 and 100 milliseconds respectively, with scores based on reaction times. In congruent trials, participants need to categorise stimuli as angry-unpleasant words (left) and happy-pleasant words (right) and in incongruent trials, participants need to categorise the presented words in the same way, whilst faces appear on the opposite side of the computer screen in angry-pleasant or happy-unpleasant configurations. Psychometric properties of the DVAT have not been reported.

Limiting cross-study comparison, the reviewed studies of emotion recognition in others used different sets and numbers of photos (ranging from unreported in Jones *et al.* 2007, to 48 to 150), different numbers of emotion categories (for example, some including happiness and some not), two studies morphed photos with neutral photos to measure FER of different emotion intensities (Bowen *et al.* 2013; Gonzalez-Gadea, 2014) and five studies employed time limits (Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014; McCown *et al.* 1986, 1988), whilst all other studies failed to report whether time limits were used at all (except Sato *et al.* 2009). Furthermore, all emotion recognition tasks (with exception of the CERT and ELT) use male and female stimuli, yet all samples were exclusively male.

1.6.5.2 *Procedure*

All studies gave an indication of the sample location and setting, but only four studies gave a more detailed description of the setting of data collection (Carr & Lutjmeier, 2005; Jones *et al.* 2007; Möller *et al.* 2014; Moriarty *et al.* 2001). All studies failed to report dates of data collection, although Carr & Lutjemeier (2005) reported that data collection took two weeks.

Four studies reported participation occurred in groups (McCown *et al.* 1986, 1988; Moriarty *et al.* 2001, Savitsky & Czyzewski, 1978), three studies report one-by-one participation (Carr & Lutjemeier, 2005; Möller *et al.* 2014; Zimmermann, 2006) and four studies failed to report on this factor (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; Sato *et al.* 2009). Duration of test administration is also important to report, in order to consider ease of study replication and cross-study difference in factors such as participant fatigue (Vandenbroucke *et al.* 2007). However, duration was reported in only two of the reviewed studies (Möller *et al.* 2014; Zimmermann, 2006).

1.6.5.3 *Ethical considerations*

Coughlan *et al.* (2007) note that studies should report how informed consent, confidentiality, and ethical permission has been ensured, in line with the BPS code of human research ethics (2010) and Beauchamp and Childress' (2001) four fundamental moral principles: (i) autonomy (not coerced to participate, informed consent process followed, confidentiality ensured), (ii) non-maleficence (no risk of harm), (iii) beneficence (research of benefit to participant and society) and (iv) justice (all participants treated as equals).

With the exception of Bowen *et al.* (2013) and Gonzalez- Gadea *et al.* (2014), none of the reviewed studies specifically report on having been granted ethical approval. Furthermore, five studies failed to report consent procedures (McCown *et al.* 1986, 1988; Möller *et al.* 2014; Savitsky & Czyzewski, 1978; Zimmermann, 2006), especially important as nine of the reviewed studies recruited participants under 16 years of age. Furthermore, in the study by Möller *et al.* (2014), factual crime interviews were completed to assess participant reflective functioning. This is likely to have been stressful and may have led to response bias

Although Zimmerman (2006) doesn't report consent procedures, he does report that the study was conducted in compliance with the ethical code of the Swiss Society of Psychology and reports on participants' privacy, confidentiality and right to withdraw. Similarly, Sato *et al.* (2009) and Gonzalez- Gadea *et al.* (2014) comment that their research was conducted in accordance with the ethical provision of the institution and the Declaration of Helsinki. Carr & Lutjemeier (2005) provided the most detailed account of ethical procedures including parental involvement in recruitment and consent, explanation of risks, purposes of the research, confidentiality, right to withdraw, incentives and debrief. However, nine studies failed to provide such an account of ethical procedures (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; Jones *et al.* 2007; McCown *et al.* 1986, 1988; Möller *et al.*2009; Moriarty *et al.* 2001; Sato *et al.* 2009; Savitsky & Czyzewski, 1978). Furthermore, although participant incentives were reported by three studies (Carr & Lutjemeier, 2005, McCown *et al.* 1986,

1988), these were either sent to parents/guardians (Carr & Lutjemeier, 2005) or only offered to YPwO and not the control group (McCown *et al.* 1986, 1988).

The current study will report ethical approval, and ensure all ethical procedures are followed and reported in accordance with the BPS code of human research (2010). Furthermore, in appreciation of participation, all participants will be entered into a prize draw for vouchers.

1.6.5.4 *Treatment for confounding variables, bias and missing data*

Vandenbroucke *et al.* (2007) recommends that if the groups that are being compared do not have similar characteristics, adjustments should be made for possible confounding variables. All studies controlled for the effect of gender by only recruiting male participants. Out of the ten studies with a control group, five studies attempted to limit the confounding effects of age by matching the control and YPwO groups (Bowen *et al.* 2013; Jones *et al.* 2007; Moriarty *et al.* 2001; Zimmermann, 2006) or controlling for age in subsequent analysis if this was significantly different between groups (Sato *et al.* 2009).

The impact of IQ on emotion recognition is controversial (see sections 1.3.3.4 and 1.3.6.4 for details). Six of the eleven reviewed studies included a measure of IQ (Bowen *et al.* 2009; Jones *et al.* 2007; McCown *et al.* 1986; Sato *et al.* 2009), verbal intelligence (Savitsky & Czyzewski, 1978) or fluid intelligence (Gonzalez-Gadea *et al.* 2014). McCown *et al.* (1986) failed to report whether IQ levels were significantly different between groups and did not control for this in subsequent analysis. Bowen *et al.* (2013) and Gonzalez-Gadea *et al.* (2014) found no between group difference in measures of intelligence, so did not control for this in subsequent analysis, although it might have been beneficial to establish whether groups differed in levels of verbal intelligence. The other three studies did report IQ or verbal intelligence to be significantly higher for controls than YPwO, and when controlling for this in subsequent analysis, found previously significant results were no longer statistically significant.

All studies, with the exception of Bowen *et al.* (2013) and Zimmermann (2006), failed to limit the confounding effects of SES. Furthermore, all studies with control groups failed to screen participants for LAC status and failed to screen control groups for offending behaviour. In fact, four studies failed altogether to report on demographic information or controlling for any confounding variables (with the exception of age and gender) (McCown *et al.* 1986, 1988; Möller *et al.* 2014; Moriarty *et al.* 2001). Moriarty *et al.* (2001) also reported to have recruited a number of YPwO from counselling groups, which was analysed as a potential confounding

variable. In terms of ethnicity, three studies commented on an equal number of 'black' or 'white' participants in each group (McCown *et al.* 1986, 1988; Savitsky & Czyzewski 1978). In terms of controlling for the difference between stimulus mode and participants, McCown *et al.* (1988) report only recruiting participants of white ethnic background to match FER photo stimuli, Carr & Lutjemeier (2005) report using the CERT (void of gender and ethnic characteristics) and the DANVA- child version so that age of the stimuli would more closely match age of participants and Sato et al (2009) analysed for between group differences between Caucasian and Japanese participants in emotion recognition of Caucasian and Japanese facial expressions and found that all participants scored significantly higher on FER on facial expressions by Caucasian actors.

Only a few studies specifically described strategies employed to reduce bias. For example, Möller *et al.* (2014) report on ensuring inter-rater reliability, Sato *et al.* (2009) report confirming understanding of emotional labels prior to participation, McCown *et al.* (1986, 1988) and Carr & Lutjemeier (2005) comment on a pre-test to ensure participants could read emotion labels and Carr & Lutjemeier, (2005) and McCown *et al.* (1986, 1988) report ensuring participant motivation by offering a reasonable incentive.

Only three reviewed studies reported on the handling of missing data. Sato *et al.* (2009) and Carr & Lutjemeier (2005) reported that all participants completed all measures and Bowen *et al.* (2013) comments on how missing data was dealt with.

1.6.6 Review of study findings

1.6.6.1 *Statistical analysis*

In terms of the statistical analysis of data, all the studies provided clear descriptions of the approaches used and presented key findings for each analysis. Three studies also reported on the use of Bonferroni correction (McCown *et al.* 1988; Sato *et al.* 2009; Zimmermann, 2006).

1.6.6.2 *Between group analyses*

All three studies examining alexithymia and offending carried out between-group analyses (Möller *et al.* 2014; Moriarty *et al.* 2001; Zimmermann, 2006). Two studies reported that although TAS-20 total and subscale scores were higher in the YPwO group than the control group (Möller *et al.* 2014; Moriarty *et al.* 2001), these differences were not statistically significant. However, Zimmermann (2006) reported that, relative to controls, YPwO scored significantly higher on TAS-20 ($t(80)=3.14$, $p<.0125$) and TAS-DIF ($t(80)=2.89$, $p<.0125$), indicating a greater degree of alexithymia.

Zimmermann (2006) also reported that significantly more participants met the cut-of score for alexithymia in the YPwO (47.2%) than those in the control group (21.7%) ($t = 5.94$, $p<.05$). However, Möller *et al.* (2014) did not find the TAS mean score to exceed cut-off for alexithymia in the YPwO group. Möller *et al.* (2014) also carried out between group analyses of YPwO with violent and non-violent offences and, consistent with the original proposition made by Nehemiah *et al.,* (1976) that alexithymia can reduce one's emotional regulation ability and increase the risk of violent expression of emotional states, found that violent offenders scored higher on TAS -20, although these differences were not statistically significant. Of note, the study conducted by Möller *et al.* (2014) study is the only one of the three alexithymia studies which conducted subgroup analysis, evidencing the need for further research conducting subgroup analysis.

When comparing the above findings, it is worth considering that, unlike Zimmermann (2006), Möller *et al.* (2014) compared YPwO data to a normative group from another study, and neither Möller *et al.* (2014) nor Moriarty *et al.* (2001) reported on additional demographic variables such as SES. Furthermore, Möller *et al.* (2014) or Moriarty *et al.* (2001) recruited smaller samples than Zimmermann (2006) and the sample in the study by Moriarty et al. (2001) was limited to YPwO with sexual offences only.

Findings of the reviewed studies with regard to the ability of YPwO to recognise others emotions, are also varied. Two studies reported no significant between group difference in FER (Carr & Lutjemeier, 2005; McCown *et al.* 1988), although Carr & Lutjemeier (2005) report that overall FER recognition scores were lower for YPwO than controls. McCown *et al.* (1988) report that, relative to the control group, 59% of the YPwO group made fewer FER errors. However, this study was limited in that the variance in FER errors in YPwO group was so large that any between group comparative analysis was biased.

A further two studies reported significant between group differences in FER scores, with YPwO scoring significantly lower than controls ($p<.02$), although this difference was no longer significant when controlling for confounding variables of verbal intelligence or education (Gonzalez-Gadea *et al.* 2014; Savitsky & Czyzewski, 1978). These findings are consistent with studies reporting a significant relationship between cognitive or verbal ability and emotion recognition (Barchard & Hakstian, 2004; Herba & Phillips, 2004; Mitchell, 2007; Moore, 2001).

Jones *et al.* (2007) also evidenced the impact of verbal intelligence on emotion recognition scores, reporting that YPwO scored significantly lower on FER of anger ($p<.01$), fear ($p<.05$) and disgust ($p<.01$), but when controlling for verbal intelligence, significance values decreased to FER of anger ($p=.05$), fear ($p= .12$) and disgust ($p<.05$). These findings are consistent with those reported by Sato *et al.* (2009), who found, using statistical analysis using Bonferroni's correction and controlling for the effects of age and IQ, that YPwO were less accurate than controls in FER of disgust ($p<.05$). Of note, Sato *et al.* (2009) reported that overall scores were lowest for recognition of disgust. Sato *et al.* (2009) also reported that YPwO more frequently incorrectly selected the anger label to describe disgusted facial expressions than the control group ($p<.05$). These findings are consistent with negative attribution bias theory, whereby making negative interpretations of another's emotions and intent are likely to be related to offending behaviour (Crick & Dodge, 1994; Dodge, 2006).

McCown *et al.* (1986) also reported statistically significant results, with YPwO scoring significantly lower overall on FER ($p<.05$) and specifically on recognition of surprise, sadness and disgust. However, the between group difference for FER sadness and disgust was reported as significant with the p value at .05, not <.05, indicating that only surprise scores were significantly lower for YPwO than controls. Furthermore, amongst a number of other limitations, McCown *et al.* (1986) failed to report whether IQ scores were correlated with FER scores and whether IQ scores were significantly different between groups.

Findings of significance between group differences in recognition of disgust and surprise correspond with research indicating that, of the six basic emotions, disgust and surprise are the most difficult facial expressions to recognise (Rodger *et al.* 2015; Durand *et al.* 2007; Montirosso *et al.* 2010).

Using a context-sensitive measure of emotion recognition (TASIT-EET), Gonzalez-Gadea *et al.* (2014) reported that YPwO showed significantly lower emotion recognition scores than controls, even when controlling for age and education ($p<.002$). Of note, the TASIT-EET has been criticised for less than ideal psychometric properties. Measuring recognition scores of emotions at different intensities has also been reported to be more realistic to everyday situations (Herba *et al.* 2006). Similarly, Bowen *et al.* (2013) reported that, relative to controls, YPwO were significantly worse at identifying sadness ($p<.05$), low intensity anger ($p<.05$) and high intensity fear ($p<.05$). In subgroup analyses, Bowen *et al.* (2013) also found that, relative to YPwO with low severity offences, YPwO with high severity offences were significantly worse at identifying low intensity anger ($p<.05$), but significantly better at recognising high intensity anger ($p<.05$). These findings can be interpreted as a reflection of

YPwO being at increased risk of having experienced poor biopsychosocial circumstances (see section 1.2), which impede development of emotion recognition abilities, and, according to the Violence Inhibition Model (Blair, 2005), prevent appropriate behavioural responses.

1.6.6.3 *Correlational analyses*

Consistent with reports of the correlation between verbal and cognitive ability and emotion recognition, Savitsky & Czyzewski (1978) reported that verbal ability and FER were significantly correlated ($p<.05$) and Jones *et al.* (2007) reported that vocabulary ability and FER of fear were significantly correlated ($p<.05$).

Several studies measured correlations between the main study variable (alexithymia or emotion recognition of others) and other variables such as empathy, psychopathic traits or anxiety. By definition of the systematic literature review question, only findings related to the relationship between emotion recognition and offending behaviour in YPwO will be reported.

Carr & Lutjemeier (2005) reported a negative correlation between violent offences and FER recognition and a positive correlation between FER of anger and offending (and specifically theft offences). This is consistent with findings reported by Bowen *et al.* (2013), who found that, relative to YPwO with low severity offences, YPwO with high severity offences were significantly worse at recognising low intensity anger ($p<.05$), but significantly better at recognising high intensity anger ($p<.05$). These findings are not surprising in light of previously mentioned research that YPwO are more likely to have experienced repeated exposure to negative social environments, such as rejection, relationship breakdowns and harsh parenting, facilitating learning of obvious anger-related stimuli (Herba & Phillips, 2004).

1.6.6.4 *Multiple regressions*

Consistent with previous analyses, the multiple regression analysis conducted in the study by Bowen *et al.* (2013), indicated that offence severity accounted for a significant amount of variance in the accuracy of FER of anger (at 25% intensity) ($R^2 = .21$, $p<.05$), but no other emotion categories.

Zimmermann (2006) reported that, of the variables measured, alexithymia ($R^2 = .11$, $p<.05$) and family structure ($R^2 = .32$, $p<.05$) were the strongest discriminatory factors of offending. In a second hierarchical regression, alexithymia and family structure correctly classified 63.9% of the YPwO and 78.3% of the control group. Furthermore, the likelihood of being in the YPwO group increased by 40% for each five point increase on the TAS-20 and that adolescents from a disrupted family were 5.8 times more likely to be in the YPwO group than

participants from an intact home. These findings are consistent with reports that the risk of offending is doubled for children from disrupted families (Pryor & Rodgers, 2001) and alexithymia can reduce one's emotional regulation ability and increase the risk of violent expression of emotional states (Nehemiah, 1976) and offending behaviour (Fonagy, 2003).

1.6.7 Review of study discussions

1.6.7.1 *Overview*

All studies provided summaries of the key findings in the discussion and provided at least some discourse regarding the limitations of the study (except McCown *et al.* 1986) and all except two studies (Carr & Lutjemeier, 2005; McCown *et al.* 1986) provided interpretation of the findings. However, all except four studies (Jones *et al.* 2007; Moriarty *et al.* 2001; Savitsky & Czyzewski, 1978; Zimmermann, 2006) failed to specifically comment on the generalizability of the findings and only four studies indicated the research funding source (Bowen *et al.* 2013; Gonzalez-Gadea *et al.* 2014; Sato *et al.* 2009; Savitsky & Czyzewski, 1978).

1.6.7.2 *Clinical implications*

Several studies discuss how the findings of emotion recognition deficits in YPwO may have important implications for policy and practitioners, with a redirected intervention focus on improving emotion recognition (Bowen *et al.* 2013; Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014; Zimmermann, 2006), to encourage recognition of victim distress and pro-social behaviour, rather than the Criminal Justice System's current approach of punishment and rehabilitation (Bowen *et al.* 2013). Zimmermann (2006) concludes his paper by recommending that intervention should focus on supporting YPwO to "convert motor behaviour to verbal behaviour" (Marohn, 1990, p.426). Considering the fact that several studies reported findings of cognitive and verbal ability impacting on emotion recognition performance, the study by Savitsky & Czyzewski, (1978) was the only one to recommend intervention for YPwO should focus on increasing verbal skills to support prosocial behaviour when YPwO feel under threat.

1.6.7.3 *Research recommendations*

The papers reviewed recommend that future research should include a control group, larger samples and female participants (Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014). A number of studies also provided specific research recommendations to (i) support the understanding of developmental factors involved in impaired recognition of facial expressions such as childhood abuse and neglect (Sato *et al.* 2009), (ii) examine differences

in emotion recognition in YPwO subgroups (Jones *et al.* 2007) and (iii) investigate the relationship between emotion recognition and relationships (Möller *et al.* 2014).

1.6.8 Summary

The above review includes studies of varying quality examining emotion recognition ability of YPwO. All studies with higher quality scores (≥60%) reported statistically significant findings, whereas only two of the six lower quality studies (quality score ≤50%), reported statistically significant results, increasing the confidence in the validity and reliability of the former findings. Taken together, these studies provide evidence that YPwO are more likely than non-offending controls to present with a deficit in emotion recognition, reporting higher scores of alexithymia (and difficulty identifying feelings in oneself) and lower scores in emotion recognition of others, especially disgust, sadness, low intensity anger and high intensity fear. There also appears to be some evidence that these findings may be due to a relationship between verbal/cognitive ability, emotion recognition, family structure and offending.

The above review highlighted several limitations of relevant research completed to date. For example, relative to facial emotion recognition studies, only three English language published studies have reported on the relationship between alexithymia and YPwO (Moriarty *et al.* 2001; Möller *et al.* 2014; Zimmermann, 2006). Further limitations include male only participant groups, relatively small sample sizes and limited consistency in terms of measures used and consideration of demographic data (including, YPwO offence types, frequency and severity), which limits cross-study comparison and generalisability of findings. Yet, in terms of age, and Westernised location of studies, findings from these studies are likely to have some relevance for the current study. Furthermore, the majority of studies recruited YPwO who had committed a range of offences, which will also be comparable to the current study.

The current study aims to build on these limitations and research recommendations made, by accurately describing participant inclusion/exclusion criteria, recruiting both male and female participants, recruiting 100 participants (with a clear rationale), including a measure of social support and completing data analysis between offending subgroups in relation to outcome variables. The reviewed studies also provided some evidence to suggest that demographic variables such as verbal IQ, education, family structure, and age should be capture in research interested in emotion recognition in YPwO. Therefore qualifications, years in education and looked after child status are included in the demographic questionnaire of the current study.

1.7 Thesis rationale and hypotheses

1.7.1 Thesis rationale

A review of the literature identified that although several studies have considered the FER ability of YPwO, only two studies were identified to have been completed in the UK, and of these, only one was completed with a community sample of YPwO. Alexithymia appears to be less commonly studied with samples of YPwO, and does not appear to have been researched with a British sample of community YPwO. Furthermore, a review of the literature identified no verbal emotional prosody recognition studies with YPwO. Only three of the completed emotion recognition studies with YPwO, considered the impact of offending variables (offence type including violent and non-violent offences and offence severity) and all studies were completed with male participants. It has been noted too that no studies to date have measured both alexithymia *and* ability to recognise others' emotions in a sample of YPwO.

The review of relevant literature also identified the proposition that emotion recognition deficits are related to difficulties with interpersonal relationships and levels of social support. There appears to be significantly more research investigating the relationship between alexithymia and social support than the relationship between ability to recognise others' emotions and social support. Furthermore, emotion recognition and social support remains relatively unstudied with adolescents and does not appear to have been studied with a sample of YPwO, although the research recommendation has been made (Möller *et al.* 2014).

From the review of the literature, YPwO appear stuck in an inter-related cycle of adverse life experiences, reduced social support and deficits in emotional skills (see Figure 1.8). Yet, these needs have not been extensively researched with YPwO. In order to develop effective practice for YPwO, the WG has emphasised the vital importance of better understanding the complex interplay of needs of young people who offend and how to respond on a case by case basis (WG/YJB, 2014).

Figure 1.9: Inter-related cycle of adverse life experiences in YPwO

The current study aims to build on research completed to date by including a measure of VEPR, and considering the relationship between alexithymia and recognition of others' emotions (through facial expressions and verbal emotional prosody) and the relationship between emotion recognition and perceived social support availability and quality. The research will be completed with a community sample of YPwO and an age, SES and gender-matched comparison group with no self-reported offending history.
Lastly, the current study will examine the impact of variables of gender and offending frequency, severity and type (violent vs non-violent) on emotion recognition ability and perceived social support. It is hoped that findings will offer an improved understanding of the psychosocial factors related to offending behaviour to inform clinical practice and policy and offer targeted and effective interventions for YPwO.

1.7.2 Hypotheses

1.7.2.1 *Whole group hypotheses*

1. There will be significant correlations between emotion recognition and perceived social support
    a. There will be significant negative correlations between TAS-20 scores and MSPSS total, Family and Friends scores.
    b. There will be a significant positive correlation between VEPR total and MSPSS total scores
    c. There will be a significant positive correlation between FER total and MSPSS total scores
2. There will be significant correlations between emotion recognition measures
    a. There will be a significant negative correlation between VEPR total and TAS-20
    b. There will be a significant negative correlation between FER total and TAS-20
    c. There will be a significant positive correlation between FER total and VEPR total

1.7.2.2 *Between group differences in outcome variables*

3. Relative to controls, YPwO will show significantly higher levels of alexithymia than the comparison group (especially TAS-20 total score and DIF score)
4. Relative to controls, YPwO will show significantly lower accuracy in recognising negative emotions through verbal prosody.
5. Relative to controls, YPwO will show a significantly lower accuracy in recognising negative facial emotions, specifically sadness, high intensity fear and low intensity anger.
6. Relative to controls, YPwO will report significantly lower levels of perceived social support

CHAPTER TWO: METHODOLOGY

2.1 Aims of research

The purpose of this study was to determine whether young people who offend (YPwO) have poorer emotion recognition ability and perceived social support levels than a non-offending control group. Further aims of the study were to explore the correlation between outcome variables (especially emotion recognition and perceived social support variables) and relationships between demographic and outcome variables. Lastly, if subgroups within the YPwO sample are identifiable, a further aim includes determining between subgroups differences of emotion recognition and perceived support levels.

2.2 Design

2.2.1 Methodology

This study used a cross-sectional between-subjects quantitative design. The methodology also allowed correlational analysis to be conducted to explore the relationships between the different constructs measured (alexithymia, recognising others emotions and perceived social support). Psychometric measures were used to investigate emotion recognition levels and perceived social support of YPwO, in comparison to a control group of young people reported to not have offended. Psychometric methodology was chosen with the rationale of demonstrating the valid and reliable use of self-report and performance questionnaires instead of more comprehensive interview methodology, when the resources for these are not available.

Both participant groups completed a demographic questionnaire and four psychometric measures: the Multidimensional Scale of Perceived Social Support (MPSS), the Toronto Alexithymia Scale (TAS-20) (Bagby *et al.* 1994a; 1994b), a Facial Emotion Recognition (FER) Task using photos from those provided by Ekman & Friesen (1976) (Bowen *et al.* 2013) and a Verbal Emotional Prosody Recognition (VEPR) Task developed by a previous Cardiff University Clinical Psychology Doctorate Trainee (Davies, 2015). These measures are described in detail in the 'measures' section. Recruitment of the control group was purposely undertaken from a population that would be similar in terms of gender, age and demographic background to the YPwO group. Demographic differences between participant groups are outlined in Chapter Three.

2.2.2 Service user involvement

A group of young people (with and without a known offending history) were consulted prior to commencement of the study. Young people's thoughts were gathered around the assessment measures, materials for recruitment and questionnaire format and administration. Young people expressed a number of concerns and suggestions, including:

- *Privacy of data: will I be identifiable?*
- *What if I don't want people to know the offences I've committed?*
- *What if someone's dyslexic?*
- *The questionnaire needs more explanation: why are you asking these questions? Some of the questions are really personal.*
- *Preference to complete computer questionnaire as opposed to paper-based questionnaire*
- *A chance to win a £10 voucher is a good incentive*
- *The information sheet, debrief sheets and questionnaire need more colour and pictures*

This information was used to modify the design of the research methodology and materials. Thus, a clear explanation was provided in the written information and prior to interview about privacy of data, reasons for participation and the personal nature of some questions, which could be left blank by selecting 'prefer not to say'. The questionnaire and all written information was enhanced with colour and pictures. To reduce difficulties related to dyslexia and other reading deficits, participants were given the option to wear headphones throughout questionnaire completion to listen to recorded verbal instructions alongside the written instructions.

2.3 Participants

2.3.1 Sample size calculations

Zimmermann (2006) states that with the expected effect size for group differences in alexithymia (estimated at 0.65), the sample size required for a two-tailed independent t-test to detect the effect at a significance level of 0.05 with a power of 0.80 is 78 (Cohen, 1988)- 39 in each group. Zimmermann was able to recruit 82 participants (36 offenders and 46 controls). The study completed by Bowen *et al*. (2013), on which the present study is also based, included 100 participants (63 offenders and 37 controls). Based on the aforementioned studies, this study aims to recruit 100 participants (50 YPwO; 50 controls).

2.3.2 Inclusion and exclusion criteria

The study group consisted of males and females aged 14-18, in current contact with any of the three South-East Wales Youth Offending Teams (Newport, Caerphilly-Blaenau Gwent

and Monmouthshire-Torfaen) and with capacity to provide informed consent themselves (and via parent/guardian if aged 14-15). The control group consisted of male and female participants aged 14-18 who reported to not have been in contact with the justice system and had capacity to provide informed consent (as well as parent/guardian consent if aged 14-15). Any participants suspected of being intoxicated at the time of consent or interview were excluded from participation.

2.4 Procedure

2.4.1 Recruitment

The study group was recruited by contacting Operational Managers from the three South-East Wales Youth Offending Services (YOS). The project was discussed and agreed with the YOS managers before attending YOS Team Meetings. During the YOS team meetings, I provided case workers with research information and inclusion/exclusion criteria. Case workers then approached young people who might be suitable to take part. If young people expressed an interest, case workers provided me with the young persons' contact details (with young people's consent) or contacted me to arrange a time to meet the young person together. Case workers also notified young people of the research whilst they attended Youth Offending meetings and court hearings. I located myself in a designated room on these premises and if young people expressed an interest to participate, the case worker would alert me for participation arrangements to be made with the young person.

The control group was recruited by discussing and agreeing project details with relevant personnel from local education and youth services. Potential participants were provided with research information and inclusion/exclusion criteria through staff communication and study posters. If young people expressed an interest, staff informed me of the most suitable times for the young people to participate.

All young people displaying interest to participate were provided with an information sheet (see Appendix C), researcher contact details and a consent form (see Appendix D), before data collection. Furthermore, time was allocated prior to participation to talk through the information sheet and discuss any questions. All young people were informed that taking part was voluntary and would not affect any services they were receiving.

2.4.2 Consent

All participants (and their parents/guardians if aged 14 or 15) were required to complete a consent form before taking part in the study (see Appendix D). The consent form asks

participants to (1) confirm they have read and understood the information sheet (see Appendix C) and had the opportunity to ask questions, (2) confirm they understand that their participation is voluntary and that they can withdraw at any time, (3) confirm they understand that their information will be anonymised and stored safely and (4) confirm they understand what the data will be used for. All participants were also requested to provide personal details in case of risk/emergency and for contact to be made if they won the voucher prize draw. They were also asked to indicate whether they could be contacted for a follow-up interview.

2.4.3 Payment

All participants were informed that travel expenses for participation could be reimbursed. Furthermore, participants were also informed that, in return for their participation, they would be entered into a prize draw to win Asda vouchers to the value to £10. Following completion of data collection, 10 participants from each group were selected at random to receive the vouchers.

2.4.4 Data collection/storage

Data collection took place between September and December 2015. On completion of consent and personal information forms, all data was collected via a computer administered questionnaire (see measures for details). Questionnaires were laptop-administered via Medialab (Jarvis, 2012) which combined all assessment measures into a continuous task. Questionnaires were completed on a one by one basis, in people's homes, local education establishments, youth centres and at premises used by Youth Offending Services. Participants were invited to ask questions throughout participation and were provided with a debrief form following participation (see Appendix E). All information collected was anonymised and kept confidential. No participants disclosed information indicating they or someone else might be at significant risk, which would have required confidentiality to be broken (see ethical issues for further information). Information kept on paper (consent and personal information) was stored in a locked cabinet in an NHS building used for clinical placement.

2.5 Measures

All participants completed five self-report measures through the Medialab software package (Empirisoft Corporation, New York). Measures included a demographics questionnaire, a perceived social support measure (MSPSS), an alexithymia measure (TAS-20) and two measures of emotion recognition of others, including a facial emotion recognition task and

verbal emotional prosody recognition task. For the YPwO group, the demographics questionnaire also included a section for participants to indicate what offence(s) they had committed.

2.5.1 Demographic questionnaire

Informed by variables related to the outcome measures (such as age, gender, looked after child status), a questionnaire was designed to collect demographic information (see Appendix G). Participants provided information about their age, gender, ethnicity, academic achievement (grades on academic work and qualifications), whether they had ever spoken to a professional about emotional difficulties and whether they had ever spent time in care. Socio-economic status (SES) was estimated using the United Kingdom's Office of National Statistics estimates of average household weekly income based on the participant's postcode (Low= £0-£520; Middle= £521-670; High= £671+).

For the offender group, the demographic questionnaire also included a multiple-choice self-report measure of offences committed, informed by the Youth Justice Board Counting Rules March 2006- April 2007 (as cited Bowen *et al.* 2013). Offences were presented in subsections (violent; sexual; motoring; drug; robbery, theft or arson; public order; other). Participants were also given the choice to 'prefer not to say' or were able to select and specify 'other' offences, if their offence was not listed. Each offence was assigned an offence severity score based on the Youth Justice Board Counting Rules ranging from 1 (e.g. minor public order offences) to 8 (e.g. murder) (see Appendix M). For the committed offences, severity, type (violent or non-violent) and number of offence types was recorded through a multiple choice questionnaire, requesting participants to tick the offence(s) they had committed. This data was collected with the intention of identifying subgroups within the offender group for further analysis (see section 3.5.5)

2.5.2 Measure of perceived social support

Participants were requested to completed the Multidimensional Scale of Perceived Social Support (Zimet *et al.* 1988), which is based on Barrera's (1986) primary properties of social support and findings from social support literature suggesting different sources of social support to serve different functions (Osman *et al.* 2014). Following revision of the original 24-item scale, the 12 item measure is designed to be self-completed and brief, assessing perceived availability and adequacy of emotional and instrumental support from three sources: family, friends and significant other. Each item is rated on a 7-point Likert scale ranging from "very strongly disagree" to "very strongly agree". Total subscale scores (family,

friends, significant other) range from 4 to 28 and total composite MSPSS scores range from 12 to 84, with a higher score indicating higher levels of perceived social support.

The MSPSS is the most widely used measure of perceived social support (Osman *et al.* 2014) and has been translated into a number of languages and tested in populations in and outside the United States (Hardan- Khalil & Mayo, 2015). The MSPSS has shown excellent internal consistency, both as a whole and for each of its subscales (Cronbach's alpha >.85) across many different samples (Calvete & Connor-Smith, 2006; Canty-Mithel & Zimet, 2000; Miville & Constantine, 2006; Zimet *et al.* 1988, 1990), good test-retest reliability ranging from *r* =.72 to *r* =.85 (Zimet *et al.* 1988) and consistent support for the MSPSS three factor structure (Calvete & Connor-Smith, 2006; Canty-Mitchel & Zimet, 2000; Clara *et al.* 2003; Zimet et al. 1988). The positive psychometric properties of the MSPSS have been demonstrated amongst adolescents specifically (Bruwer *et al.* 2008, Canty-Mitchel & Zimet, 2000; Ramaswamy *et al.* 2009), with great internal consistency (Cronbach's alpha ranging from .86 to .90 for the subscales and .86 for the MSPSS total scale) and construct reliability (*r* >.70) (Bruwer *et al.* 2008).

2.5.3 Measure of alexithymia

Participants were requested to complete the Toronto Alexithymia Scale (TAS-20; Bagby *et al.* 1994a; 1994b) which is considered a robust measure of alexithymia (Karukivi *et al.* 2011; Säkkinen *et al.* 2007; Taylor *et al.* 2010). The TAS-20 is a 20-item, self-report measure of alexithymia (see Appendix G), in which respondents are asked to read 20 statements and select, on a 5-point Likert scale, the degree to which they believe this statement applies to them, ranging from 'strongly disagree' to 'strongly agree' (five items require reverse scoring). The TAS-20 provides an overall alexithymia score, ranging from 20 to 100, as well as three inter-correlated subscale scores: Difficulty identifying feelings (DIF) (e.g. *"I am often confused about what emotion I am feeling"*); Difficulty describing feelings (DDF) (e.g. *"I find it hard to describe how I feel about people"*); Externally oriented thinking (EOT) (e.g. *"I prefer to just let things happen rather than to understand why they turned out that way*"). A higher score indicates higher levels of alexithymia difficulties and adult cut-off scores of TAS-20 ≥61 have been used in previous research (Taylor *et al.* 1997), although such clinical cut-off scores have not been validated with adolescents (Parker *et al.* 2010).

The TAS-20 has a good level of internal consistency (α = .81), as have its subscales (DIF Cronbach's alpha =.78; DDF Cronbach's alpha = .75; EOT Cronbach's alpha = .66) and test-retest reliability is also good (r =.77, p<.01) (Bagby *et al.* 1994a). Convergent validity has been demonstrated with correlations between TAS-20 scores and personality scale scores

such as openness to feelings and fantasy (Bagby *et al.* 1994b) and the five factor model of personality and an external locus of control (Zimmermann *et al.* 2005), which are expected to be consistent with the experience of alexithymia. TAS-20 concurrent validity has been confirmed, with significant correlations found between the TAS-20 and other measures used in alexithymia research, such as the Beth Israel Hospital Psychosomatic Questionnaire (Arimura *et al.* 2002; Bagby *et al.* 2006).

TAS-20 psychometric properties have been confirmed with samples of young people (Parker *et al.* 2010; Säkkinen *et al.* 2007, Zimmermann *et al.* 2007) and adult offenders (Kroner & Forth, 1995). Evaluating TAS-20 psychometric properties with a sample of adolescents, Zimmermann *et al.* (2007) reported internal reliability coefficients and mean inter-item correlations as acceptable for DIF (Cronbach's alpha > .60; mean inter-item correlation= 0.22) and good for DDF (Cronbach's alpha > .70, mean inter item correlation=0.33) and internal reliability as poor for EOT (Cronbach's alpha < .60). Indeed, the validity of the EOT subscale has received considerable criticism and has been described as satisfactory and moderate (Parker *et al.* 2003, 2010; Säkkinen *et al.* 2007). The reliability of this subscale has also been questioned (Kooiman *et al.* 2002).

Having said that, factorial validity has been evidenced of the TAS-20 in many different languages and cultures (Taylor *et al.* 2003) and in a review of the literature, Bagby *et al.* (2007) note that research which has used confirmatory factor analysis does support the use of a three- factor model for alexithymia. The same conclusion has also been drawn from a study of adolescents (Säkkinen *et al.* 2007). Furthermore, the TAS-20 has also been successfully used with samples of YPwO (Möller *et al.* 2014; Moriarty *et al.* 2001; Zimmermann, 2006). In view of the aforementioned literature, the TAS-20 was considered appropriate for measuring alexithymia in the current study. It has been recommended that adaptations are made to alleviate reading deficits and co-morbid difficulties (such as inattention or learning difficulties) which are particularly likely to affect EOT psychometric problems (Parker *et al.* 2010; Säkkinen *et al.* 2007). Therefore, all participants were given the option to wear headphones throughout questionnaire completion to listen to the audio-recorded TAS-20 statements alongside the written statements, and the questionnaire was computer-administered with the aim of enhancing attention levels.

2.5.4 Facial Emotion Recognition

Designed and administered through the Medialab application (Jarvis, 2012), participants were requested to complete the Facial Emotion Recognition (FER) task, as developed by Bowen *et al.* (2013) based on Ekman and Friesen's (1976) facial affect battery. The Ekman-

Friesen Pictures of Facial Affect test (Ekman & Friesen, 1976) has been used in hundreds of studies to assess facial emotion recognition ability of the six basic emotions (Ekman & Cordaro, 2011) (happiness, sadness, fear, surprise, disgust and anger). The test involves selecting which emotion is best represented by each of a series of photographs of male and female faces. Images are shown in random order. The measure has good reliability (Ekman & Friesen, 1976; Frank & Stennet, 2001) and has been used with many different age groups from young children (Uljarevic & Hamilton, 2013) to older adults (Calder *et al.* 2003). Research has also been completed with children and adolescents using Ekman & Friesen's (1976) photographs and morphing these with neutral expressions to create different levels of emotion intensities (Montirosso *et al.* 2010).

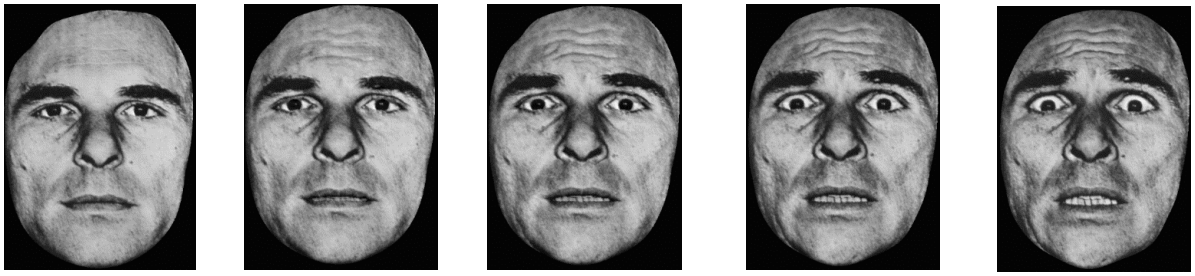
Research predominantly indicates that, of the six basic emotions, disgust and surprise are the most difficult facial expressions to recognise (Rodger *et al.* 2015; Durand *et al.* 2007). The photographs of these emotional expressions were therefore not included to avoid making the task too difficult. Aiming to minimise task fatigue and demotivation alongside administration of the other measures, a briefer version of the FER task was used (with permission of the developer), consisting of 34 (17 male and 17 female) rather than 150 facial expressions and four emotional states instead of the original six (happiness, sadness, fear and anger). Each target displayed a neutral expression or one of four emotional expressions at varying emotional intensities (25%, 50%, 75% and 100%) by being morphed with their matching neutral expression (see Figure 2.1). Thus, in total, the 34 facial expressions shown consisted of 2 neutral expressions (1 male and 1 female photo) and 2 repeats of each emotion intensity for each emotional category (16 male and 16 female photos). The hair and background of each image was blacked out, so only facial features remained.

The measure included a practice session of five items, one example of each of the four emotions and a neutral example. The practice test included the following instructions for participants:

> *"You will be shown male and female faces expressing different emotions. You will be asked to identify the emotion of each face. You will be given five options to choose from. You will first get a chance to practice to get used to what you need to do. Click continue to begin."*

The question*, "What emotion is this person showing?"* accompanied each item, along with the five emotional categories (listed in the same order each time), which participants were required to select to indicate their response. No time limits were applied. The current study measured percentage correct scores for each emotion intensity, each emotion and overall FER.

Figure 2.1: The Facial Emotion Recognition task illustrating emotional intensities of fear



0% 25% 50% 75% 100%

2.5.5 Verbal Emotional Prosody Recognition

The Verbal Emotional Prosody Recognition Task (VEPR) was developed by a previous Cardiff Clinical Psychology Trainee (Davies, 2015) and consists of 30 spoken statements (15 spoken by a male actor and 15 spoken by a female actor). The following lexically neutral statement, designed for previous research, is used in the measure: *"His glasses are on the table",* (Boaz *et al.* 2011). Items were randomised using the random function in Excel, giving the final order for the statements of neutral prosody and four emotional tones (anger, fear, happiness and sadness), each repeated 6 times. The VEPR was piloted, with all items reaching good reliability ($r > .80$).

Replicating the methods used in the FER, this measure also included a practice session of five items, one example of each of the four emotions and a neutral voice example. The practice test included the following instructions for participants:

> *"In this task you will hear male and female actors speaking a sentence. Try to identify their emotion. You will be given five options to choose from. You will first get a chance to practice to get used to what you need to do. You will only hear each sentence once, so listen carefully. Click continue to begin."*

After the practice session, participants were informed that the test would begin using the following instruction:

> *"Your practice has finished and you will now start the task. Try to be as accurate as possible. Click continue when you are ready."*

The question*, "What is the speaker's emotion?"* accompanied each item, along with the five emotional categories (listed in the same order each time), which participants were required to select to indicate their response. The instructions for the practise test and the final assessment were identical, as were the corresponding numbers for each emotion. No time limits applied and audio statements were played only once. The responses for each item

were recorded via Medialab and the data was automatically recorded in an Excel spreadsheet for analysis. The current study measured percentage correct scores for each emotion and overall VEPR.

2.6 Ethical considerations

2.6.1 Ethical approval

Ethical approval for this study was obtained from Cardiff University School of Psychology Research Ethics Committee (see Appendix F). NHS National Research Ethics Committee approval was not required, as the study did not recruit participants through NHS settings.

2.6.2 Participant well-being

Although the research questionnaire include several personal questions, participation in this study was not anticipated to cause significant distress. Nevertheless, participants were invited to ask questions throughout their participation if they did not understand anything or required further support. Additionally, a period of time was allocated to debrief participants after completion of the measures to discuss any concerns that may have arisen. An accessible debrief form (Appendix E) containing support service information was also given to all participants.

2.6.3 Researcher well-being

A risk assessment protocol was followed to ensure the safety of the researcher whilst visiting participants in the community. Regular meetings with research supervisors provided the opportunity for reflection of the psychological impact of the study and supported maintenance of emotional well-being.

2.6.4 Funding

The research was funded by Cardiff and Vale University Health Board, NHS Wales as part of the researcher's doctoral training in Clinical Psychology.

2.7 Plan for statistical analysis

2.7.1 Missing data

Two potential participants in the control group did not take part, as they disclosed they had been in touch with offending services, in response to being asked, "have you ever been in trouble with the police?". All participants were invited to complete all measures. The only variable with missing data was the demographic questionnaire. One participant did not report accommodation status and nine participants did not report on therapeutic status.

Furthermore, two YPwO reported they had committed an offence, but did not disclose the nature of this offence, so offence severity and offence type (violent or non-violent) could not be determined.

2.7.2 Statistical analysis

Data was analysed using SPSS 20 (IBM Corporation, 2011). Prior to analysis, the data was checked to determine assumptions for parametric analysis. This process involved inspecting the data and conducting preliminary analysis on all continuous variables, checking for outliers, skew and kurtosis. Several true outliers were identified and many variables were not normally distributed. As several variables violated the assumptions required for parametric data analysis, bootstrapping methods (Efron & Tibshirani, 1993) were used as a robust approach to statistical analyses, based on a review of the evidence available (see section 3.2 for details). Bootstrapping methods estimate the distribution properties of the sample by taking smaller samples from the data and calculating the mean from each bootstrap sample based on the values between which 95% of the bootstrap sample estimates fall (also known as the bootstrap confidence interval; Field, 2013). Bias corrected and accelerated (BCa) confidence intervals were used, as these are considered slightly more accurate than the 95% percentile confidence interval, in minimising the bias of mean (Efron & Tibshirani, 1993; Field, 2013).

Descriptive statistics were used to present the demographic characteristics of the sample and to collate basic findings. Preliminary analysis identified significant between group differences relating to several demographic factors. Bootstrapped t-tests were carried out to determine whether these variables would significantly confound group differences in measures of emotion recognition and perceived support.

Correlational analyses were used to explore the relationship between the constructs measured. Bootstrapped ANOVA and ANCOVA analyses were completed to establish between group differences in TAS, VEPR and MSPSS total and subscale scores. Repeated measures MANOVA analyses of FER scores were completed to establish effects of emotion intensity, effects of group and interaction effects between group and emotion intensity.

Lastly, bootstrapped two-tailed t-tests and repeated measures MANOVA tests were completed to identify any between group differences in the YPwO subgroups identified.

CHAPTER THREE: RESULTS

3.1 Introduction

This chapter provides an account of the data cleaning process and testing of assumptions for parametric analysis. Secondly, the descriptive statistics regarding demographic variables will be presented for the YPwO group and control groups, including the descriptive analyses of the main clinical and demographic variables.

Inferential analyses commence with (a) analysis of the sample as a whole, testing correlations between outcome variables (bivariate correlational analyses). This is followed by (b) Univariate and Multivariate analyses of between group differences (YPwO and controls) in outcome measures. Lastly, bimodal and trimodal patterns within the YPwO group are reported, including presentation of demographic and clinical characteristics and between group analyses (where appropriate).

3.2 Preliminary analysis

3.2.1 Type one error risk reduction

Carrying out a large number of inferential analyses increases the risk of Type One errors, incorrectly rejecting the null hypotheses. Although this might be combatted by using the Bonferroni correction (Field, 2013), it was decided not to use this method, because Bonferroni corrections are highly conservative and can lead to missing significant relationships (Sedgwick, 2012), particularly when completing analyses of relationships between survey-based variables (Bland & Altman, 1995; Perneger, 1998). Although results of analyses will be reported as significant if $p<0.05$, these will be interpreted with greater caution than those that meet the more robust $p<0.01$ or $p<.001$ level.

3.2.2 Data cleaning and assumption for parametric analysis

The data set was checked to determine assumptions for parametric analysis. This process involved inspecting the data and conducting preliminary analysis on all continuous variables, including: Age, TAS-20 total score and subscale scores, MSPSS total score and subscale scores, VEPR total score and subscale scores and FER total score and subscale scores.

3.2.2.1 *Missing data*

All participants were invited to complete all measures. The only variable with missing data was the demographic questionnaire. One participant did not report accommodation status

and nine participants did not report therapeutic status (see Table 3.1). Furthermore, two YPwO reported they had committed an offence, but did not disclose the nature of this offence, so offence severity and offence type (violent or non-violent) could not be determined.

3.2.2.2 *Error analysis and outliers*

Data was checked for obvious input errors by visually scanning the minimum and maximum values for each variable and checking that these fell within the possible range; no input errors were found. SPSS outlier analysis, excluding cases pairwise, was conducted with the continuous variables to identify outliers and extreme values. Inspection of the frequency distributions and corresponding box plots identified several outliers. An outlier labelling technique (Hoaglin & Iglewicz, 1987), was used to identify values as true outliers, revealing the majority of outliers to be true outliers. Each data point was identified and checked for commonly reported outlier reasons, including checks for data entry error (all outliers were checked against the raw data) and intentional misreporting (no pattern was identified of one/certain participants causing outlier data) (Osborne, 2013).

Initial t-tests were conducted with outliers included and removed to establish whether removing outliers would make a difference to statistical significance (see Appendix H). Secondly, guidance was sought in handling extreme values through supervisor consultation and reviewing relevant literature, leading to the decision not to remove outlier data points with the following clear rationale. Including outliers can produce bias to subsequent analysis and introduce Type 1 errors (Field, 2013), but removing outliers and continuing parametric analysis can impact on estimation of standard error (Bakker & Wicherts, 2014). Although transformations can be applied to non-normal data as an alternative to removing outliers (Field, 2013; Pallant, 2013), some critics argue this method does not always lead to normal data distribution, and has side effects of reducing power and altering the nature of the data, subsequently impacting interpretation (Osborne, 2013). Another option is to use non-parametric data analysis (Bakker & Wicherts, 2014), although this is less powerful than parametric analysis and can still be affected by outliers (Osborne, 2013). Bootstrapping methods (Efron & Tibshirani, 1993) are the most recent recommended appropriate approach to statistical analysis when legitimate outliers lead to a non-normal distribution (Bakker & Wicherts, 2014; Wilcox, 2012).

3.2.2.3 *Check for normality*

Parametric analysis assumes that the data are normally distributed in the sample. This was reviewed in the current study by visual inspection of the histograms, normal Q-Q plots and

box plots and calculating a z-score for skewness and kurtosis by dividing each by its standard error, with a z-score >1.96 indicative of an unsatisfactory level (Field, 2013). The aforementioned process indicated that many variables were not normally distributed (z score > 1.96 and/or p<.05 (see Appendix I). This is not uncommon in social science measures (Pallant, 2013), whether completed with clinical or non-clinical populations (Wright *et al.* 2011). Wright *et al.* (2011) note that parametric tests 'often make unrealistic assumptions about variables' distributions…in data derived from clinical samples, or when looking at groups responding at the extreme end of clinical constructs' (p. 252). Furthermore, psychometric factors such as number of scoring options or measuring an underlying trait not fitting the study sample may also lead to non-normal data (Bakker & Wicherts, 2014). A psychometric factor of note in the current study is that FER emotion intensity scores are likely be unequally distributed, as higher intensity emotions are naturally more likely to be accurately recognised than lower intensity emotions (Bowen *et al.* 2013). This skewness and kurtosis is likely to be more pronounced for emotions which literature suggests are easier to recognise (such as happiness). As several variables violated the assumptions required for parametric data analysis, bootstrapping methods (Efron & Tibshirani, 1993) were used as a robust approach to inferential statistical analyses, based on a review of the evidence available (see next section 3.2.2.4).

3.2.2.4 *Inferential statistical analysis- bootstrapping*

In light of the presence of legitimate outliers and non-normal data distribution with the current sample being a representative of the target population (Aguinis *et al.* 2013; Bakker & Wicherts, 2014; Wilcox, 2012), bootstrapping methods (Efron & Tibshirani, 1993) available on SPSS version 20, were considered the best approach to conduct the planned inferential statistical analyses (see section 2.7).

Bootstrapping methods can be used to find standard errors and confidence intervals for almost any statistic (Field, 2013). Bootstrapping methods estimate the distribution properties of the sample by taking smaller samples from the data and calculating the mean from each bootstrap sample based on the values between which 95% of the bootstrap sample estimates fall, also known as the bootstrap confidence interval (Field 2013). Bias corrected and accelerated (BCa) confidence intervals were used, as these are considered slightly more accurate than the 95% confidence interval, minimising the bias of mean (Efron & Tibshirani, 1993; Field, 2013). The confidence limits generated were used to test the null hypothesis for each hypothesis, accepting the null hypothesis if the BCa confidence intervals included zero. Bootstrapping methods of 2000 samples were used for t-test and ANOVA analyses, allowing inferences to be made on normally and non-normally distributed data (Field *et al.* 2013; Wright *et al.* 2011).

3.3 Sample characteristics

3.3.1 Demographic characteristics

Demographic information for the sample can be found in Table 3.1, statistical analyses revealed no significant difference between groups in terms of age, gender, ethnicity (collapsing 'non-white British' ethnicities), academic grades, qualifications and socio-economic status ($p>0.05$). The following significant demographic differences were found between groups.

Employment status differed significantly between the groups ($\mathcal{V}$=0.42, p=0.01). A higher proportion of the control group reported to be studying (72%) in contrast to the YPwO (44%) and a higher proportion of the YPwO (26%) reported to be working (including 6% attending a government training scheme) in comparison to the control group (6%).

As many accommodation types contained fewer than two cases, accommodation types were grouped into living with family/partner and not living with family/partner (including living alone, no fixed accommodation, foster/residential care and supported living). Accommodation differed significantly between the groups (χ^2 = 14.91, p< 0.001). The majority of the control group reported to be living with their family or partner (96%), in comparison to 64% of the YPwO.

Therapeutic input differed significantly between the groups (χ^2 = 8.76, p<0.01), with 40% of the YPwO and 14% of the control group reporting to have received therapeutic input. Therapeutic input reported by the control group included "(bereavement) counselling", "support worker", "self-harm counselling" and "anger management". Therapeutic input reported by the YPwO included "(school/private/bereavement) counselling", "(CAMHS) Psychologist", "CAMHS", "inpatient Mental Health Nurse", "Social Services", "mediation".

Care (LAC) status differed significantly for the two groups (χ^2 = 15.43, *p*<0.001), with 38% of YPwO and 4% of the control group having spent time in care.

Table 3.1: Demographic summary of YPwO and Control groups

Demographic variable	YPwO (N=50)	Control (N=50)	Between Group Difference
Mean age, years (SD)	16.32 (1.17)	16.24 (0.98)	*t* =0.37
Gender % (N)			
Male	76% (38)	76% (38)	χ^2 = 0.00
Female	24% (12)	24% (12)	
Ethnicity % (N)			
White	92.0% (46)	98.0% (49)	
Mixed ethnic groups	2.0% (1)	2.0% (1)	$\mathcal{V}$= 0.17
Asian/Asian British	2.0% (1)	0.0%	
Black/African/Caribbean/Black	2.0% (1)	0.0%	
Other	2.0% (1)	0.0%	
Academic Grades % (N)			
Mostly A*- C	48.0% (24)	54.0% (27)	χ^2 = 0.16
Mostly D-fails	52.0% (26)	46.0% (23)	
Qualifications % (N)			
≤ 4 GCSE's	84% (42)	74% (37)	χ^2 = 1.56
≥ 5 GCSE's - 2 A levels	16% (8)	26% (13)	
Employment % (N)			
Work (paid or unpaid)	26.0% (13)	6.0% (3)	
Study	44.0% (22)	72.0% (36)	$\mathcal{V}$=0.42*
Work and study	2.0% (1)	12.0% (6)	
No work or study	28.0% (14)	10.0% (5)	
Accommodation % (N)			
Living with family/partner	66% (33)	96% (48)	χ^2 = 14.91***
Not living with family/ partner	34% (17)	2% (1)	
Missing data		2% (1)	
Therapy % (N)			
Yes	40.0% (20)	14.0% (7)	
No	48.0% (24)	80.0% (40)	χ^2 = 8.76**
Missing data	12.0% (6)	6.0% (3)	
LAC % (N)			
Yes	38.0% (19)	4.0% (2)	χ^2 =15.43***
No	62.0% (31)	96.0% (48)	
Socio-economic status % (N)			
Low	66.0% (33)	56.0% (28)	$\mathcal{V}$=0.11
Middle	26.0% (13)	36.0% (18)	
High	8.0% (4)	8.0% (4)	

** p<0.05; **p<0.01; ***p<0.001*

3.3.2 Relationships between demographic variables and outcome variables

As the two groups differed on employment, accommodation, therapy and LAC status, bootstrapped t-tests were carried out to determine whether these variables would confound group differences in measures of emotion recognition and perceived social support. To save space, only significant differences between demographic and outcome variables are reported.

3.3.2.1 *Accommodation*

In terms of verbal emotional prosody recognition, young people not living with family/partner scored significantly lower on anger recognition (t (97) = -2.37, p<.05). In terms of facial emotion recognition, young people not living with family/partner scored significantly lower on recognition of fear 50% intensity (equal variances not assumed, t (97) = -2.45, p<.05) and anger 100% intensity (equal variances not assumed, t (97) = 2.56, p>.05). In terms of perceived social support, young people not living with family/spouse reported significantly lower MSPSS total scores (t (97) = -2.17, p<.05) and MSPSS family scores (t (97) = -4.16, p<.01).

3.3.2.2 *Therapy*

In terms of alexithymia, young people who had received therapy reported significantly higher TAS-20 total scores (t (89) = 3.20, p<.01), TAS-DIF scores (equal variances not assumed, t (89) = 4.51, p<.0001) and TAS-DDF scores (t (89) = 3.69, p<.0001). In terms of perceived social support, young people who had received therapy reported significantly lower MSPSS family scores (t (89) = -2.30, p<.05). Therapy status seems to be associated with alexithymia (particularly identifying and describing feelings) and levels of perceived support from family.

3.3.2.3 *Care status*

In terms of alexithymia, young people with LAC status reported significantly higher TAS-DIF scores (t (98) = 2.07, p<.05) and TAS-DDF scores (t (98) = 2.00, p<.05). In terms of verbal emotional prosody, young people with LAC status scored significantly lower on VEPR total (t (98) = -2.61, p<.05) and fear (t (98) = -3.32, p< .01). In terms of facial emotion recognition, young people with LAC status scored significantly lower on recognition of sadness 50% intensity (t (98) = -2.13, p<.05). In terms of perceived social support, young people who spent time in care reported significantly lower MSPSS total scores (t (98) =-2.33, p<.05) and family subscale scores (t (98) = -3.76, p<.01). Care status seems to be associated with inability to identify and describe feelings, inability to recognise emotions through verbal prosody (particularly fear) and recognise sadness (at 50% intensity) through facial expressions and lower perceived levels of social support (from family in particular).

3.3.3 Impact of other demographic variables

Although age, gender, grades, qualifications and socio-economic status were matched across the two groups, previous research suggests that these variables can be associated with emotion recognition and perceived social support. Therefore, bootstrapped analyses were carried out to establish whether these findings would be replicated in the current sample. Three out of the five variables were associated with outcome variables. To save space, only statistically significant results are reported below.

3.3.3.1 *Gender*

In terms of alexithymia, an inconsistent gender pattern was observed. Males reported significant less difficulty on TAS-20 as a whole (*t* (98) = -2.57, p<.05), TAS-DIF subscale (*t* (98) = -2.83, p<.05) and TAS DDF subscale (*t* (98) = -3.85, p<.01). In terms of FER, males scored lower than females on recognition of facial happiness at 100% intensity (*t* (98), = -2.29, p<.05), facial sadness at 50% intensity (*t* (98) = -1.99, p<.05) and facial anger at 75% intensity (equal variances not assumed, *t* (98) = 2.12, p<.05). Gender seems to be associated with alexithymia (ability to identify and describe feelings in particular) and ability to recognise happiness, sadness and anger (at certain intensities) through facial expressions.

3.3.3.2 *Grades*

In terms of alexithymia, compared to young people with A-C grades, young people with D-fail grades scored significantly higher on the TAS-DDF subscale, suggesting they have significantly more difficulties describing feelings (*t* (98) = -2.31, p< .05). In terms of verbal emotion prosody recognition, compared to young people with A-C grades, young people with D-fail grades scored significantly lower on recognition of verbal emotional prosody in total *(t* (98) = 2.53, p<.05) and happiness (*t* (98) = 2.16, p<.05). In terms of FER, compared to young people with A-C grades, young people with D-fail grades scored significantly lower on recognition of facial happiness 100% intensity (equal variances not assumed, *t* (98) = 2.34, p <.05), facial happiness 75% intensity (equal variances not assumed, *t* (98) = 2.33, p <.05), and facial anger 75% intensity (*t* (98) = 2.29, p< .05). Academic ability seems to be associated with ability to describe feelings and ability to recognise emotions through verbal prosody (particularly happiness) and to recognise happiness and anger (at certain intensities) through facial expressions.

3.3.3.3 *Qualifications*

In terms of facial emotion recognition, relative to young people with ≥ 5 GCSE's, young people with ≤ 4 GCSE's scored significantly lower on recognition of facial happiness 75% intensity (equal variances not assumed, *t* (98) = -3.42, p< .05) and 100% intensity (equal variances not assumed, *t* (98) = -2.29, p< .05).

3.3.3.4 *Summary of demographic variables*

Several demographic factors were associated with outcome variables, which suggests that consideration will need to be given in subsequent analyses. Young people with therapeutic involvement reported significantly higher alexithymia scores (TAS-20, TAS, DIF, TAS-DDF) and significantly lower perceived support from family. LAC status accounted for a number of significant differences, including those with LAC status reporting significantly more difficulties identifying and describing feelings and significantly lower levels of perceived social support overall and from family. Those with LAC status also obtained significantly lower VEPR total and fear scores and FER sadness scores (at 50% intensity). Difference in accommodation status was suspected to be largely accounted for by LAC status, confirmed by a statistically significant relationship between accommodation and LAC status (χ^2 = 46.36, p<.001) (83% of young people not living with family/partner reporting LAC status and 96% of young people living with family/partner reporting non-LAC status). Thus, where accommodation and LAC status both accounted for group differences, LAC status was considered as the relevant confounding factor to control for in subsequent analyses. A summary of confounding variables controlled for in subsequent between group analyses is provided in Table 3.2.

Table 3.2: Summary of potentially confounding variables specific to outcome variables

Subscale	Covariate: **Accommodation**	Covariate: **LAC status**	Covariate: **Therapy status**
TAS-20			✓
TAS-DIF		✓	✓
TAS-DDF		✓	✓
VEPR total		✓	
VEPR fear		✓	
VEPR anger	✓		
FER sadness 50%		✓	
FER fear 50%	✓		
FER anger 100%	✓		
MSPSS total		✓	
MSPSS family		✓	✓

Relative to females, males reported significantly lower levels of alexithymia (TAS-20; TAS-DIF; TAS-DDF), but gained significantly lower FER happiness (total and 100%), sadness (at 50% intensity) and anger (at 75% intensity) scores. Grades and qualifications largely accounted for significant difference in the same outcome variables. Compared to young people with higher grades (A*-C), young people with lower grades (D-fails) reported significant more difficulty describing feelings (TAS-DDF) and gained significantly lower VEPR total and happy scores and FER happiness (at 75% and 100% intensity), sadness (at 100% intensity) and anger (at 100% intensity) scores.

3.4 Examination of relationship between variables

3.4.1 Bivariate correlations

One-tailed bootstrapped tests of bivariate correlations were completed for the whole sample to specifically test hypotheses one and two. Two-tailed bootstrapped tests of bivariate correlations were also completed for all continuous variables for the whole sample. Due to running a large number of statistical tests, bivariate correlations were only run separately for the YPwO group and control group for each one-tailed hypothesis and where p<.01 in the whole sample, two-tailed analysis (see Appendix J).

Hypothesis One: There will be significant correlations between emotion recognition and perceived social support

1a) There will be significant negative correlations between TAS-20 total scores and MSPSS total, Family and Friends scores.

As displayed in Table 3.3, supporting the hypothesis, TAS-20 scores were significantly negatively correlated with MSPSS total scores (*r* (98)= -.19, p<.05), MSPSS Family subscale score (*r* (98)= -.19, p<.05) and MSPSS Friends subscale scores (*r* (98)= -.20, p<05), indicating a significant, although modest, negative correlation between alexithymia and perceived social support as a whole and from family and friends. The one-tailed test of bivariate correlations was run separately for the YPwO and control groups. A significant correlation was only found between the TAS-20 and MSPSS friends subscale scores for the control group (*r* (48)= -.29, p<.05). This indicates that the correlation between low alexithymia and high perceived social support from friends was only relevant for the control group and the whole group correlations found need to be interpreted with caution.

Whole sample two-tailed tests of bivariate correlations showed significant negative correlations between TAS-DIF and MSPSS total scores (*r* (98)= -.33, p<.01), MSPSS Family subscale scores (*r* (98)= -.38, p<.001) and MSPSS Friends subscale scores (*r* (98)= -.31, p<.01). Two-tailed bivariate correlations were run separately for these significant correlations for each group. For YPwO, significant negative correlations remained between TAS-DIF and MSPSS total (*r* (48)= -.32, p<.01) and MSPSS Family subscale scores (*r* (48)= -.35, p<.01), but were not found between TAS-DIF and MSPSS friends (*r* (48)= -.25, p=. 08). For the control group significant negative correlations were found between TAS-DIF and MSPSS total (*r* (48)= -.29, p<.01), MSPSS Family (*r* (48)= -.35, p<.001) and MSPSS friends (*r* (48)= -.35, p<.001). This indicates that for young people with and without known offending history, there is an association between high levels of difficulties identifying feelings and low levels of perceived social support (overall and from family). For young people without a known offending history, there is also an association between high levels of difficulties identifying feelings and low levels of perceived social support from friends.

1b) There will be a significant positive correlation between VEPR total and MSPSS total scores

As displayed in Table 3.3, supporting the hypothesis, VEPR and MSPSS total scores were significantly positively correlated (r (98)= 23, one-tailed p<.05). This suggests that improved verbal emotional prosody recognition ability is associated with higher levels of perceived social support. The one-tailed test of bivariate correlations was run separately for the YPwO and control groups. Significant correlations were not identified for each group individually, which suggests that the modest whole group correlations need to be interpreted with caution.

Whole sample two-tailed tests of bivariate correlations revealed modest significant positive correlations between MSPSS total and VEPR sadness and fear scores; MSPSS family and VEPR total, 'happiness' and 'sadness scores; MSPSS friends and VEPR fear scores; and MSPSS Significant other and VEPR sad and fear scores (all at p<.05). Two-tailed tests of bivariate correlations were run separately for these significant correlations for the YPwO group and the control group. No significant correlations were found, suggesting that the aforementioned significant correlations should be interpreted with caution.

1c) There will be a significant positive correlation between FER total and MSPSS total scores

As displayed in Table 3.3, supporting the hypothesis, FER total and MSPSS total scores were significantly positively correlated (r (98)= .24, p<.01), indicating that improved ability to recognise emotions through facial expressions is correlated with higher levels of perceived social support. One-tailed tests of bivariate correlations were run separately for the YPwO group and control group, revealing no significant correlations between FER and MSPSS total, which suggests that the whole sample correlation needs to be interpreted with caution.

Whole sample two-tailed tests of bivariate correlations also revealed modest significant positive correlations between MSPSS total scores and FER neutral scores, MSPSS family scores and FER total scores and 'happiness' scores and MSPSS Significant other scores and FER total scores (all at p<.05), and MSPSS significant other scores and FER neutral scores (p<.01). Two-tailed tests of bivariate correlations were run separately for these significant correlations for the YPwO group and the control group. Modest significant correlations remained for the YPwO group between MSPSS significant other scores and FER Neutral scores (p<.05) and MSPSS total scores and FER neutral scores (p<.05).

Hypothesis 2: There will be significant positive correlations between emotion recognition measures

2a) There will be a significant negative correlation between VEPR total and TAS-20

As displayed in Table 3.3, rejecting the hypothesis, VEPR total and TAS-20 total scores were not significantly correlated (*r* (98)= .00, one-tailed p= .49). This indicates that no association was found between ability to recognise emotions through verbal prosody and alexithymia. One-tailed tests of bivariate correlations were run separately for the YPwO group. In the YPwO group, a significant positive correlation was found between VEPR total and TAS-20 scores (*r* (48)= .26, one-tailed p<.05). In the control group, a significant negative correlation was found between VEPR total and TAS-20 scores (*r* (48)= -.29, one tailed p<.05). This indicates that in the control group, higher VEPR scores are associated with lower alexithymia scores, whereas, unexpectedly in the YPwO group, higher VEPR scores were associated with lower alexithymia scores. Of note, both correlations are of modest significance, so should be interpreted with caution.

Two-tailed tests of bivariate correlations revealed a modest significant negative correlation between VEPR of happiness and TAS-DIF subscale scores (*r* (98)= -.19, p<.05) and VEPR of sadness and TAS-EOT subscale scores (*r* (98)= -.25, p<.05). This suggests an association between increased ability to recognise happiness through verbal prosody and reduced levels of difficulties identifying feelings; and increased ability to recognise sadness through verbal prosody and reduced levels of externally oriented thinking. Two-tailed tests of bivariate correlations were run separately for these significant correlations for the YPwO group and the control group. A significant negative correlation was only found for the control group between VEPR of happiness and TAS-DIF subscale scores (*r* (48)= -.30, p<.05), suggesting that, amongst the control group, increased VEPR scores are associated with reduced difficulty identifying feelings, although these results are again modest in significance.

2b) There will be a significant negative correlation between FER total and TAS-20 scores

As displayed in Table 3.3, rejecting the hypothesis, FER total and TAS-20 total were not significantly correlated (*r* (98)= .15, one-tailed p= .07). One-tailed tests of bivariate correlations were run separately for the YPwO group and control group. This revealed no significant correlation in the control group, but unexpectedly, revealed a significant positive correlation in the YPwO group (*r* (48)= .33, p<.05), suggesting that higher FER total scores are associated with higher alexithymia scores.

Two-tailed tests of correlations revealed a significant positive correlation between FER total scores and TAS-EOT subscale scores (*r* (98)= .20, p<.05), indicating an association

between ability to recognise emotions through facial expressions and high levels of externally oriented thinking. This should however, be interpreted with caution, as no significant correlation was found for any specific facial emotions and the TAS-EOT subscale. Furthermore, when two-tailed tests of bivariate correlations for this significant correlation was run separately for the YPwO group and the control group, no significant correlations were found.

2c) There will be a significant positive correlation between FER total and VEPR total scores
As displayed in Table 3.3, supporting the hypothesis, there was a significant positive correlation between FER total and VEPR total (r (98)= .66, one-tailed $p<.001$). One-tailed tests of bivariate correlations were run separately for the YPwO group and the control group. This showed a significant correlation between FER total and VEPR total scores in both groups ($p<.001$).

Two-tailed tests of bivariate correlations also revealed significant correlations between the vast majority of FER scores and VEPR scores (ranging from $p<.05$ to $p<.001$). This indicates a strong association between ability to recognise emotions from faces and ability to recognise emotions from verbal prosody. Two-tailed tests of bivariate correlations were run for these significant correlations for the YPwO group and the control group, which showed a greater number of significant correlations between FER scores and VEPR scores in the YPwO group, than the control group (see Appendix J). This suggests that the association between FER and VEPR is stronger in the YPwO group than the control group.

Table 3.3: Bivariate correlations between the main study variables (N=100)

		Age	TAS				MSPSS				VEPR						FER					
			TAS-20	DIF	DDF	EOT	Total	Family	Friends	Sig O	Total	Happy	Sad	Fear	Anger	Neutral	Total	Happy	Sad	Fear	Anger	Neutral
TAS	**Total**	.03	-																			
	DIF	-.41	.88**	-																		
	DDF	.09	.78**	.64**	-																	
	EOT	.05	.60**	.23*	.20*	-																
MSPSS	**Total**	-.10	-.19*[1]	-.33**	-.09	.09	-															
	Family	-.06	-.19*[1]	-.38***	-.07	.13	.87***	-														
	Friends	-.10	-.20*[1]	-.31**	-.11	.04	.80***	.54***	-													
	Sig. O	-.08	-.59	-.10	-.05	.04	.78***	.55***	.41***	-												
VEPR	**Total**	.02	-.00[1]	-.13	-.00	.18	.23*[1]	.24*	.15	.17	-											
	Happy	-.04	-.09	-.19*	-.04	.07	.17	.21*	.13	.06	.67***	-										
	Sad	.07	.13	.04	-.04	-.25*	.21*	.21*	.09	.23*	.75***	.32**	-									
	Fear	.01	-.15	-.17	-.13	-.20	.25*	.17	.22*	.22*	.72***	.35***	.51***	-								
	Anger	.03	.08	-.03	.12	.14	.12	.17	.03	.08	.58***	.26**	.32**	.19*	-							
	Neutral	.02	.04	-.07	.01	.19	.07	.11	.05	.02	.77***	.37***	.53***	.47***	.29**	-						
FER	**Total**	.15	.15[1]	.73	.14	.20*	.24**[1]	.23*	.15	.21*	.66***[1]	.38***	.57***	.39***	.44***	.53***	-					
	Happy	.01	.11	.45	.13	.05	.19	.19*	.08	.18	.28**	.31**	.14	.16	.28**	.07	.38***	-				
	Sad	.12	.18	.29	.18	.16	.15	.18	.07	.10	.43***	.22*	.49***	.19	.27**	.36***	.75***	-.01	-			
	Fear	.15	.03	.69	.03	.12	.17	.13	.16	.13	.47***	.23*	.41***	.36***	.32**	.36***	.68***	.07	.34***	-		
	Anger	.14	.04	.85	-.03	.15	.03	.03	-.00	.04	.42***	.26**	.30**	.21*	.23*	.44***	.63***	.08	.39***	.19	-	
	Neutral	-.08	.05	-.06	.09	.14	.25*	.17	.17	.29**	.29**	.06	.29**	.22*	.19	.29**	.41***	.08	.27**	.16	.12	-

***TAS**= Toronto Alexithymia Scale; **MSPSS**= Multidimensional Scale of Perceived Social Support; **VEPR**= Verbal Emotion Prosody Recognition; **FER**= Facial Emotion Recognition. Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The null hypothesis was rejected if the BCa confidence intervals did not cross zero. (*bootstrapped p<.05, **bootstrapped p<.01, ***p<.001); [1]one-tailed analysis and p value*

3.5 YPwO, emotion recognition and social support

3.5.1 Toronto Alexithymia Scale

3.5.1.1 *Descriptive statistics and comparison to existing data*

Of the whole sample, 39% reported clinically significant levels of alexithymia using the TAS-20 cut-off (≥61) (Taylor *et al.* 1997), of which 25 were male and 15 were female. At group levels, clinically significant levels of alexithymia were represented by 50% of YPwO (M=68.12, SD= 6.31) and 28% of the control group (M= 66.43, SD= 4.16). Comparing TAS-20 and subscale scores for YPwO from the current study and Zimmermann's (2006) study, two-tailed t-tests from mean scores and standard deviations (unequal variances assumed), identified no significant differences.

3.5.1.2 *Between subjects analyses*

It was hypothesised that relative to controls, YPwO would score significantly higher in the TAS-20 and TAS- DIF subscale. Bootstrapped univariate ANCOVA analyses (controlling for therapeutic input for TAS-20, TAS-DIF and TAS-DDF and LAC status for TAS-DIF and TAS-DDF) revealed no significant differences between groups for TAS-20, TAS-DIF or TAS-DDF scores (see Table 3.4). Although differences between groups were not significant for TAS-total, TAS-DIF and TAS-DDF, it is worth noting that the mean scores were higher for the YPwO than the control group (see Table 3.4). Unexpectedly, significant between group differences were found in TAS-EOT subscale scores ($F(1,98)= 4.16$, $p<.05$, $\eta_p^2=.04$).

Inspection of group means revealed significantly higher scores in the EOT subscale for the control group (M=25.60, SD= 3.02) than YPwO (M= 24.02, SD= 4.57), suggesting that, in comparison to the YPwO group, the control group reported higher levels of externally orientated thinking.

Table 3.4: Descriptive and between group statistics in Toronto Alexithymia Scale scores

Subscale	**YPwO** Mean (SD)	**Control** Mean (SD)	**Group difference**	
			F (df) value	p value
TAS-20	59.27 (11.52)	56.15 (7.68)	F (1,88)= 27.06	p=.58
TAS-DIF	19.89 (6.14)	16.55 (4.61)	F (1,87)= 1.87	p=.24
TAS-DDF	15.41 (3.66)	14.06 (2.67)	F (1,87)= .36	p=.57
TAS-EOT	24.02 (4.57)	25.60 (3.02)	F (1,98)= 4.15	p<.05*

*Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The difference was significant when bootstrapped confidence intervals did not cross zero (*bootstrapped p<.05)*

3.5.2 Verbal Emotional Prosody Recognition Task

It was hypothesised that, relative to controls, YPwO would show significantly lower accuracy in VEPR of negative emotions. Although YPwO displayed lower VEPR scores, bootstrapped univariate ANOVA tests and ANCOVA tests (controlling for LAC status for VEPR total and VEPR fear; and Accommodation for VEPR anger) revealed no significant group differences, with exception of VEPR of fear ($F(1,97)= 4.54$, $p<.05$, $\eta_p^2 = .05$). Inspection of group means revealed significantly lower accuracy of VEPR of fear within the YPwO group (M= 55.67, SD= 21.72), than the control group (M= 69.33, SD =23.17). Worth noting, relative to the other emotions, VEPR of fear obtained markedly lower scores across both groups. Between- group difference in VEPR of neutral was close to significance. Across both groups, incorrect neutral recognition scores were most accounted for by participants incorrectly selecting happiness instead of neutral (see Table 3.5 for detail).

Table 3.5: Descriptive statistics and between group differences in VEPR scores

Subscale	YPwO Mean (SD)	Control Mean (SD)	Group difference	
			F (df) value	p value
VEPR Total	71.40 (15.91)	79.47 (15.64)	F (1,97)= 2.67	p=.11
VEPR happiness	70.00 (25.86)	77.33 (22.78)	F (1,98)= 2.26	p=.14
VEPR sadness	82.00(21.25)	88.67 (17.96)	F (1,98)= 2.87	p=.10
VEPR fear	55.67 (21.72)	69.33 (23.17)	F (1,97)= 4.54	p<.05*
VEPR anger	77.33 (22.27)	79.59 (21.85)	F (1,98)= .25	p=.59
VEPR neutral	71.99 (25.96)	82.67 (25.16)	F (1,98)= 43.83	p=.06

*Bias corrected and accelerated (Bca) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The difference was significant when bootstrapped confidence intervals did not cross zero. (*bootstrapped p<.05)*

3.5.3 Facial Emotion Recognition Task

It was hypothesised that, relative to controls, YPwO would show significantly lower accuracy in recognising negative facial emotions, specifically sadness, high intensity fear and low intensity anger. Repeated measures MANOVA tests were considered robust enough for FER data analysis, likely aided by the large sample size, as no marked difference in p values was observed between bootstrapped ANOVA (ANCOVA tests for sad 50% intensity, fear 50% intensity and anger 100% intensity), MANOVA and repeated measures MANOVA tests (see Appendix K). Condition for sphericity was not met for all tests ($p <.05$), so Greenhouse-Geisser correction was used to interpret F and p values (estimated epsilon >.75 for all tests). Means, SD's, group effects and interactions between group and emotion intensity are reported in Table 3.6. A significant between group difference was found for neutral

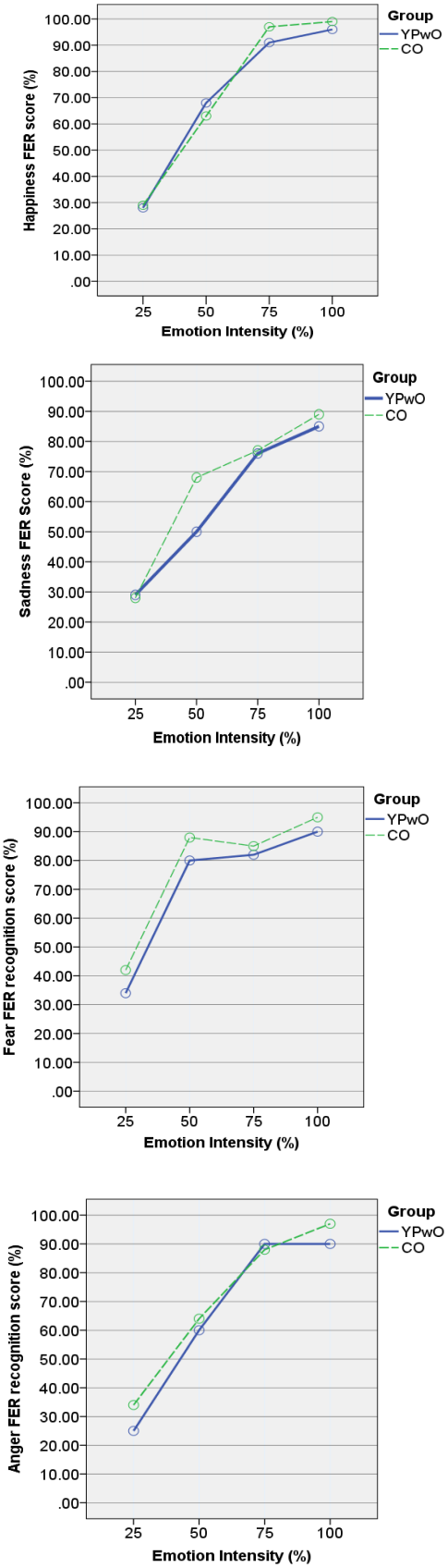
recognition (F(1,98)=17.50, p<.001). Inspection of group means revealed significantly lower accuracy of neutral FER within the YPwO group (M=65.00, SD 30.72), than the control group (M=88.00, SD- 88.00). Whereas VEPR neutral inaccurate scores were most accounted for by incorrect selection of happiness instead, FER neutral incorrect scores were most accounted for by incorrect selection of sadness scores for both groups.

Table 3.6: Descriptive and between-group statistics of Facial Emotion Recognition scores

Subscale		**YPwO** Mean (SD)	**Control** Mean (SD)	**Group difference**
Happiness	Total	70.75 (15.69)	72.00 (12.51)	F(1,98)= .19, p=.66
	25%	28.00 (33.75)	29.00 (28.73)	Interaction between intensity & group: F(2.29,225.13)= .95, p=.39
	50%	68.00 (33.14)	63.00 (33.21)	
	75%	91.00 (21.88)	97.00 (11.99)	
	100 %	96.00 (13.70)	99.00 (7.07)	
Sadness	Total	60.00 (21.27)	65.50 (17.59)	F(1,98)=1.98, p=.16
	25%	29.00 (30.46)	28.00 (33.75)	Interaction between intensity & group: F(2.72, 266.74)=2.12, p=.10
	50%	50.00 (39.12)	68.00 (38.81)	
	75%	76.00 (30.71)	77.00 (32.28)	
	100 %	85.00 (27.19)	89.00 (20.92)	
Fear	Total	71.50 (21.29)	77.50 (16.75)	F (1,98)=2.45, p=.12
	25%	34.00 (37.03)	42.00 (38.28)	Interaction between intensity & group: F(2.48, 242.58)=.23, p=.84
	50%	80.00 (25.87)	88.00 (25.87)	
	75%	82.00 (28.14)	85.00 (29.01)	
	100 %	90.00 (24.74)	95.00 (15.15)	
Anger	Total	66.25 (15.41)	70.75 (14.86)	F(1,98)= 2.21, p=.14
	25%	25.00 (32.34)	34.00 (32.64)	Interaction between intensity and group: F (2.51, 245.46)=.83, p=.46
	50%	60.00 (31.94)	64.00 (33.56)	
	75%	90.00 (24.74)	88.00 (21.57)	
	100 %	90.00 (22.59)	97.00 (11.99)	
Neutral	Total	65.00 (30.72)	88.00 (23.81)	F(1,98)=17.50, p<.001***

*** p<.001

Figure 3.1: Mean happiness, sadness, fear and anger recognition scores at 25%, 50%, 75% and 100% emotional intensity in YPwO and control groups



For happiness, there was a main effect of intensity ($F(2.29,225.13)= 179.68$, $p<.01$), suggesting happiness recognition accuracy depended on intensity of facial expression. There was no main effect of group ($F(1,98)= .19$, $p=.66$) and no significant interaction between intensity and group ($F(2.29,225.13)= .95$, $p=.39$), suggesting there was no significant between group difference in happiness recognition.

For sadness, there was a main effect of intensity ($F(2.72,266.74)=75.33$, $p<.01$), suggesting sadness recognition accuracy depended on intensity of facial expression. There was no main effect of group ($F(1,98)=1.98$, $p=.16$) and no significant interaction between intensity and group ($F(2.72,266.74)=2.12$, $p=.10$), suggesting no between group difference in sadness recognition.

For fear, there was a main effect of intensity ($F(2.48, 242.58)= 56.53$, $p<.001$), suggesting fear recognition accuracy depended on intensity of facial expression. There was no main effect of group ($F (1,98)=2.45$, $p=.12$) and no significant interaction between intensity and group ($F(2.48, 242.58)=.23$, $p=.84$), suggesting no between group difference in fear recognition.

For anger, there was a main effect of intensity ($F(2.51, 245.46)= 125.51$, $p<.001$), suggesting that anger recognition accuracy depended on intensity of facial expression. There was no main effect of group ($F(1,98)= 2.21$, $p=.14$) and no significant interaction between intensity and group ($F (2.51, 245.46)=.83$, $p=.46$), suggesting no between group difference in anger recognition.

3.5.4 Multidimensional Scale of Perceived Social Support

It was hypothesised that, relative to controls, YPwO would report significantly lower levels of perceived social support. ANCOVA analyses (controlling for LAC status for MSPSS total and MSPSS family and therapy status for MSPSS family) revealed no significant group differences (see Table 3.7). It is worth noting that MSPSS total and all subscale scores were higher in the comparison group than the YPwO group. Although, as a whole group, levels of perceived social support were similar across sources, social support levels were highest from significant others (M=21.11, SD=4.71) and lowest from friends (M=19.99, SD=5.29).

Table 3.7: Group differences for Multidimensional Scale of Perceived Social Support

Subscale	YPwO	Control	Group difference	
	Mean (SD)	Mean (SD)	F (df) value	p value
MSPSS total	59.78 (12.53)	63.78 (12.81)	F (1, 98)= .48	p=.48
MSPSS family	19.72 (6.08)	21.64 (4.90)	F (1, 98)= .02	p=.89
MSPSS friends	19.06 (5.64)	20.92 (4.80)	F (1,98)= 3.15	p=.08
MSPSS Sig. other	21.00 (4.87)	21.22 (4.59)	F (1,98)= .05	p=.82

*Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The difference was significant when bootstrapped confidence intervals did not cross zero. (*bootstrapped p<.05, **bootstrapped p<.01)*

3.5.5 Within YPwO group analyses

Several bimodal and trimodal patterns were identified within the YPwO group, including offence frequency, offence type (violent and non-violent) and offence severity (low and high severity). Below, relevant demographic characteristics and between group analyses (where appropriate) are described for each subgroup. It should be emphasised that the following findings should be interpreted with caution due to small subgroup sample sizes.

3.5.5.1 *Number of offences*

3.5.5.1.1 Descriptive statistics

As displayed in Figure 3.2, 32 YPwO three or less offences and 18 YPwO had committed four or more offences. Number of offences ranged from one to fourteen offences, with the mean number of offences committed being 3.7 (SD 3.29). Analysis for demographic differences revealed that LAC status differed significantly between the groups (χ^2 = 8.00, p<.01) (see Table 3.8):- YPwO with LAC status reported significantly more offences than YPwO without LAC status. Bootstrapped two-tailed t-tests revealed that, relative to YPwO without LAC status, YPwO with LAC status reported significantly lower levels of perceived support overall (MSPSS-total) (*t* (48)= -2.06, p<.05) and from family (*t* (48)= -3.29, p<.01). LAC status was therefore controlled for in subsequent analyses examining between group differences in MSPSS total scores and MSPSS family subscale scores.

Figure 3.2: Distribution of offence frequency

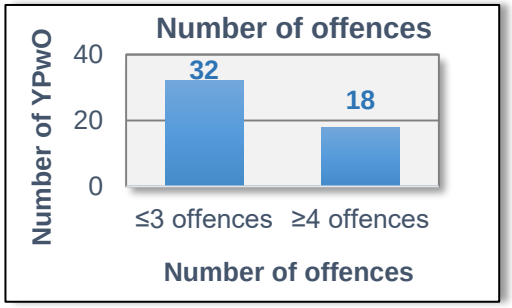


Table 3.8: Distribution of offence frequency in relation to LAC status

LAC status	≤ 3 offences	≥ 4 offences
LAC (N = 19)	7	12
Non-LAC (N = 31)	25	6

3.5.5.1.2 Between group analysis

3.5.5.1.2.1 Alexithymia

In terms of alexithymia, TAS total and TAS subscale scores were higher in the YPwO with ≥4 offences that YPwO with ≤3 offences, although bootstrapped two-tailed t-tests revealed these differences were not significant.

3.5.5.1.2.2 Perceived Social Support

In terms of perceived social support, bootstrapped ANOVA (and ANCOVA analysis for MSPSS total and MSPSS family), revealed no significant between group differences in levels of perceived social support.

3.5.5.1.2.3 Verbal Emotional Prosody Recognition

In terms of emotion recognition through verbal prosody, bootstrapped two-tailed t-tests revealed there were no significant between group differences in emotion recognition scores.

3.5.5.1.2.4 Facial Emotion Recognition

In terms of emotion recognition through facial expression, repeated Measures MANOVA tests were completed and some statistically significant results were found. Condition for sphericity was not met for analysis of happiness and anger ($p < .05$), so degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (estimated epsilon >.75).

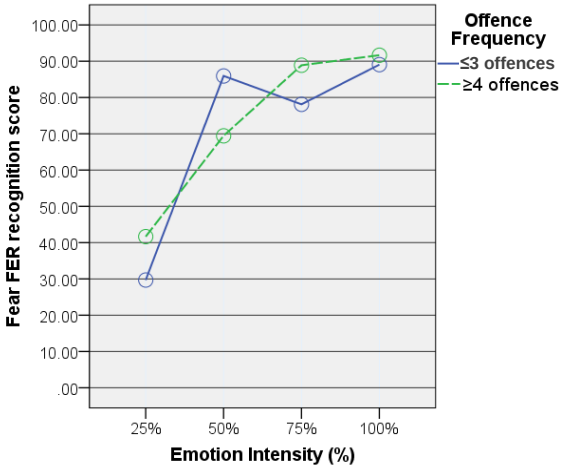
For happiness, there was a main effect of intensity ($F(2.37, 113.65) = 72.49$, $p < .001$), suggesting happiness recognition accuracy depended on intensity of facial expression. There was no main effect of group ($F(1,48) = .83$, $p = .37$) and no significant interaction between emotion intensity and group ($F(2.37,113.65) = .71$, $p = .52$), suggesting no between group difference in happiness recognition.

For sadness, there was a main effect of intensity ($F(3,144) = 38.17$, $p < .001$), suggesting that sadness recognition accuracy depended on intensity of facial expression. There was no

main effect of group (F(1,48)=1.76, p=.19) and no significant interaction between emotion intensity and group (F(3,144)= .47, p=.71), suggesting no between group difference in sadness recognition.

For anger, there was a main effect of intensity (F(2.53, 121.27)= 61.39, p<.001), suggesting that anger recognition depended on intensity of facial expression. There was no main effect of group (F(1,48)=3.46, p=.07) and no significant interaction between emotion intensity and group (F (2.53, 121.27)= .66, p=.55), suggesting no between group difference in anger recognition.

Figure 3.3: Mean fear recognition scores at 25%, 50%, 75% and 100% emotional intensity in YPwO with high and low frequency offences



For fear, there was a main effect of intensity (F (3,144)= 46.72, p<.001), suggesting fear recognition depended on intensity of facial expression. There was no main effect of group (F (1,48)=.12, p=.73), but there was a significant interaction between intensity and group (F(3,144) = 3.33, p<.05), suggesting that fear recognition across intensities may be different for YPwO with ≥3 offences and YPwO with ≤4 offences. However, simple effects tests revealed no significant differences between the groups' mean scores at any intensity (see Table 3.9).

Table 3.9: Simple effects tests of between group difference in fear recognition scores at different intensities

Fear emotion intensity	Group difference	
	F (df) value	p value
25%	F(1,48)= 1.21	p=.27
50%	F(1,48)= 3.59	p=.06
75%	F(1,48)= 1.71	p=.19
100%	F(1,48)= .13	p=.73

3.5.5.2 *Offence type*

3.5.5.2.1 Descriptive statistics

As displayed in Figure 3.4, 39 YPwO committed violent offences (they might also have committed non-violent offences) and 9 YPwO committed non-violent offences only (see Appendix L for definitions of violent and non-violent offences). Two YPwO reported they had committed an offence, but did not disclose the nature of this offence, so offence type could

not be determined. Analysis of demographic differences revealed a statistically significant difference between gender and offence type (X^2=9.23, p<.01) (see Table 3.10). Significantly more female than male YPwO reported to have committed violent offences.

Figure 3.4: Distribution of offence type

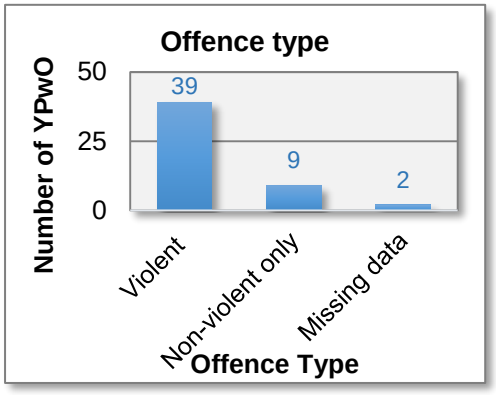


Table 3.10: Distribution of offence type in relation to gender

Gender	Violent	Non-violent	Missing
Male (N = 38)	29	9	0
Female (N = 12)	10	0	2

Bootstrapped two-tailed t-tests were completed to establish whether gender would confound group differences in measures of emotion recognition and perceived support. In terms of alexithymia, relative to female YPwO, male YPwO showed significantly lower TAS total scores (t(48)=-2.63, p<.05), TAS-DIF scores (t(48)=-3.02, p<.01) and TAS-DDF (t(48)=-3.55, p<.01). In terms of emotion recognition through verbal prosody, male YPwO scored significantly lower than female YPwO on recognising happy (t(48)=-2.12, p<.05). In terms of emotion recognition through facial expressions, male YPwO scored significantly lower than female YPwO on recognition of sad 25% intensity (unequal variances assumed t(48)=-3.31, p<.05) and anger 75% (unequal variances assumed, t(48)= -2.93, p<.05). Gender was therefore controlled for in subsequent analysis of between group differences in TAS total, TAS-DIF, TAS-DDF and VEPR happy. Gender was not controlled for in FER analysis with the same rationale provided in section 3.5.3.

3.5.5.2.2 Between group analyses

3.5.5.2.2.1 Alexithymia

In terms of alexithymia, bootstrapped ANOVA analysis (and ANCOVA analysis for TAS-total, TAS-DIF and TAS-DDF scores) revealed significant between group differences in TAS-total scores (F(1,45)= 4.09, p<.05, η_p^2=.08) and TAS-EOT scores (F(1,46)= 4.69, p<.05, η_p^2=.09) (see table 3.11). Inspection of group means revealed that relative to 'non-violent only' YPwO, 'violent' YPwO reported lower TAS-20 scores and lower TAS-EOT scores, suggesting that 'violent' YPwO reported significantly lower levels of alexithymia and externally oriented thinking than 'non-violent only' YPwO.

Table 3.11 Between group differences in Toronto Alexithymia Scale scores

Subscale	Violent Mean (SD)	Non-violent Mean (SD)	Group difference	
			F (df) value	p value
TAS-20	58.64 (11.57)	62.89 (8.46)	F (1,45)= 4.09	p<.05*
TAS-DIF	19.72 (6.18)	20.11 (5.30)	F (1,87)= 1.03	p=.32
TAS-DDF	15.46 (3.77)	15.78 (2.82)	F (1,87)= 2.05	p=.16
TAS-EOT	23.46 (4.58)	27.00 (3.54)	F (1,46)= 4.69	p<.05*

*Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The difference was significant when bootstrapped confidence intervals did not cross zero (*bootstrapped p<.05)*

3.5.5.2.2.2 Perceived social support

Bootstrapped two-tailed t-tests revealed that relative to 'non-violent only' YPwO, 'violent' YPwO reported significantly higher MSPSS friend scores (equal variances not assumed, *t* (46)= 2.47, p<.05) and significantly lower MSPSS significant other scores (*t*(46)=-2.35, p<.05). This suggests that relative to 'non-violent only' YPwO, 'violent' YPwO experience higher levels of social support from friends, but lower levels of social support from a significant other person.

3.5.5.2.2.3 Verbal Emotional Prosody Recognition

In terms of emotion recognition through verbal prosody, ANOVA analysis (and ANCOVA analysis for VEPR happy), revealed no significant between group differences (p>.05).

3.5.5.2.2.4 Facial Emotion Recognition

In terms of emotion recognition through facial expression, repeated Measures MANOVA tests were completed and some statistically significant results were found. Condition for sphericity was not met for analysis of happiness and anger (p <.05), so degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (estimated epsilon >.75). For happiness, there was a main effect of intensity (F(2.31, 106.16)= 39.85, p<.001), suggesting that happiness recognition accuracy depended on intensity of facial expression. There was no main effect of group (F(1,46)= .03, p=.86) and no significant interaction between emotion intensity and group (F(2.31, 106.16)=.24, p=.81), suggesting no between group difference in happiness recognition.

For sadness, there was a main effect of intensity (F(2.83, 130.31)= 27.59, p<.001), suggesting that sadness recognition accuracy depended on intensity of facial expression. There was no main effect of group (F(1,46)= .51, p=.48) and no significant interaction between emotion intensity and group (F(2.83, 130.31)= .23, p=.86), suggesting no between group difference in sadness recognition.

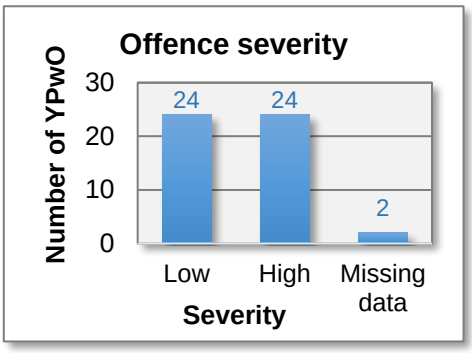
For fear, there was a main effect of intensity (F(3,138)= 23.98 , p<.001), suggesting that fear recognition depended on intensity of facial expression. There was no main effect of group (F(1,46)=.52, p=.48, and no significant interaction between intensity and group (F(3,138) =1.27, p= .29), suggesting no between group difference in fear recognition.

For anger, there was a main effect of intensity (F(2.41,110.75)= 42.21, p<.001), suggesting that anger recognition depended on intensity of facial expression. There was no main effect of group (F(1,46)=.01, p=.91) and no significant interaction between emotion intensity and group (F (2.41, 110.75)= 2.13, p=.11), suggesting no between group difference in anger recognition.

3.5.5.3 *Offence severity*

3.5.5.3.1 Descriptive statistics

Figure 3.5: Distribution of offence severity



Offence severity was determined using the Youth Justice Board Counting Rules (Bowen *et al.* 2012) ranging from 1 (e.g. minor public order offences) to 8 (e.g. murder) (see Appendix M). Inspection of offence severity score distribution showed a bimodal pattern, therefore subgroups were identified of less severe (offence severity ≤4) and more severe (offence severity ≥5) offences. In case of multiple offences, the highest severity score of offences committed was recorded. As displayed in Figure 3.5, 24 YPwO committed low severity offences only and 24 YPwO committed high severity offences (some of whom also committed low severity offences). Two YPwO reported they had committed an offence, but did not disclose the nature of this offence, so offence severity could not be determined. Offence severity ranged from 1 to 8, with the most frequent offence severity being a level 3 offence. Groups did not differ significantly in terms of demographic variables.

3.5.5.3.2 Between group differences

Bootstrapped two-tailed t-tests revealed no significant between group differences for TAS, VEPR or MSPSS scores. Repeated Measures MANOVA tests revealed significant effects of intensity for each emotion, no main group difference in FER scores and no significant interaction between group and emotion intensity.

CHAPTER FOUR: DISCUSSION

4.1 Study aims

This is the first study to investigate alexithymia, recognition of others' emotions and perceived social support in YPwO. The primary purpose of this study was to determine whether young people who offend (YPwO) have poorer emotion recognition and perceived social support levels than a non-offending control group. Further aims of the study were to explore the relationship between outcome variables (especially emotion recognition and perceived social support variables) and relationships between key demographic factors and outcome variables. The nature of the data permitted analysis of subgroups of YPwO.

4.2 Summary of study findings in relation to hypotheses

1a. There will be significant negative correlations between TAS-20 scores and MSPSS total, Family and Friends scores.

Supporting the hypothesis, a significant negative correlation was found between TAS-20 scores and MSPSS total ($p<.05$, $r = -.19$), Family ($p<.05$, $r = -.19$) and Friends scores ($p<.05$, $r =-.20$). This indicates that alexithymia is related to lower levels of perceived social support, particularly from family and friends.

1b. There will be a significant positive correlation between VEPR total and MSPSS total scores

Supporting the hypothesis, a significant positive correlation was found between VEPR total and MSPSS total scores ($p<.05$). This indicates that higher verbal emotional prosody recognition ability is associated with higher levels of perceived social support, although results need to be interpreted with caution (see below).

1c. There will be a significant positive correlation between FER total and MSPSS total scores

Supporting the hypothesis, a significant positive correlation was found between FER total and MSPSS total scores ($p<.01$), indicating that improved ability to recognise emotions through facial expressions is associated with higher levels of perceived support, although results need to be interpreted with caution (see below).

2a. There will be a significant negative correlation between VEPR total and TAS-20 scores

Failing to support the hypothesis, a significant negative correlation was not found between VEPR total and TAS-20 total scores. This indicates that there is no significant association between ability to recognise emotions through verbal prosody and alexithymia.

2b. There will be a significant negative correlation between FER total and TAS-20 scores

Failing to support the hypothesis, a significant negative correlation was not found between FER total and TAS-20 total scores. This indicates that there is no significant association between ability to recognise emotions through facial expressions and alexithymia.

2c. There will be a significant positive correlation between FER total and VEPR total

In support of the hypothesis, a significant positive correlation was found between FER total and VEPR total scores for the sample as a whole and for the control and YPwO groups separately ($p<.001$, $r = .66$).

3. **Hypothesis three: Relative to controls, YPwO will show higher levels of alexithymia than the comparison group (specifically TAS-20 and TAS-DIF)**

Failing to support the hypothesis, YPwO did not show significantly higher levels of alexithymia than the control group.

4. **Hypothesis four: Relative to controls, YPwO will show significantly lower accuracy in recognising negative emotions through verbal prosody.**

Partially offering support for the hypothesis, relative to the control group, YPwO showed significantly lower accuracy in recognising the negative emotion of fear through verbal prosody ($p<.05$), but not of anger or sadness.

5. **Hypothesis five: Relative to controls, YPwO will show a significantly lower accuracy in recognising negative facial emotions, specifically sadness, high intensity fear and low intensity anger.**

Failing to support the hypothesis, YPwO did not show significantly lower accuracy in recognising negative facial emotions. Relative to the control group, YPwO did show significantly lower accuracy in recognising neutral facial expressions.

6. **Hypothesis six: Relative to controls, YPwO will report significantly lower levels of perceived social support**

Failing to support the hypothesis, YPwO did not report significantly lower levels of perceived social support than the control group.

4.3 Summary of main findings related to demographic variables

Although effort was made to demographically match the YPwO and control groups, the two groups significantly differed in a number of demographic variables, so the impact of these variables on the outcome variables was examined to determine if these confounded group differences. Exploring the impact of all demographic variables on emotion recognition and perceived social support helped establish whether associations found in previous research were replicated in the current sample. A summary of the main demographic variables is discussed below.

4.3.1 Age (matched across groups)

4.3.1.1 *Alexithymia and recognition of others' emotions*

Age was not associated with alexithymia and VEPR ability, which is not supportive of research findings that alexithymia scores reduce throughout adolescence (Meins, *et al.* 2008; Moriguchi *et al.* 2007; Oskis *et al.* 2013; Parker *et al.* 2010; Säkkinen *et al.* 2007; Zimmermann *et al.* 2007) and emotion prosody recognition ability improves throughout development (Dimitrovsky, 1964; Nowicki & Duke, 1994; Sauter *et al.* 2013). However, compared to previous research, the current sample of participants had a relatively narrow age range. Furthermore, future research emphasis might be better placed on developmental stage and related abilities, as opposed to age, as noted by Säkkinen *et al.* (2007), who suggest that children and young adolescents' higher alexithymia levels are associated with young people's developing ability to reflect and verbalise inner experiences.

Age was also not associated with FER ability in the current adolescent sample, which is consistent with previous research indicating that level of ability to recognise others' emotions through facial expressions is close to adult level between ages 6 to 13 (Durand *et al.* 2007; Lawrence *et al.* 2015; Mancini *et al.* 2013; Rodger *et al.* 2015).

Lastly, age was not related to perceived social support. Previous research indicates that, in adolescence, there is increased influence of individuals outside the family (Canty-Mitchel & Zimet, 2000), including peers (Lambourn, 2009). In relation to these findings, the current study found that although, as a whole group, young people reported higher levels of perceived social support from significant others than from family, they also reported lower levels of social support from friends than from family.

4.3.2 Accommodation and LAC status

4.3.2.1 *Prevalence*

Previous research has reported that the majority of YPwO have histories of disrupted early attachments and loss (Casswell *et al.* 2012; Snodgrass & Preston, 2015), with 74% of YPwO having experienced family break-down (Chitsabesan *et al.* 2006) and 49% of YPwO in institutions having spent time in care (Blades *et al.* 2011). Consistent with these findings, the current study found that relative to the control group (4%), significantly more YPwO did not live with their family or partner (36%), instead living alone, in foster/residential care or supported housing or having no fixed accommodation. Furthermore, significantly more young people from the YPwO group reported to be or have been looked after by the Local Authority (38%), than young people in the control group (4%). Difference in accommodation status was suspected to be largely accounted for by LAC status, confirmed by a statistically significant relationship between accommodation and LAC status (83% of young people not living with family/partner reporting LAC status and 96% of young people living with family/partner reporting non-LAC status).

4.3.2.1.1 Alexithymia

The current study found that, relative to young people without LAC status, young people with LAC status reported significantly more difficulties identifying and describing feelings. In explanation, those with LAC status are likely to have experienced adverse relationships and events, such as deprivation, poor parenting, abuse and neglect (Biehal *et al.* 2010), factors which are significantly correlated with alexithymia (Fukunishi *et al.* 1997; Kench & Irwin, 2000; Joukamaa *et al.* 2007; Lumley *et al.* 1996a; Mason *et al.* 2005; Zimmermann, *et al.* 2006). These findings were also recently identified in a study conducted in the same geographical area by Paull (2013), who reported that care-leavers reported significantly higher levels of alexithymia in comparison to a control group, especially difficulty describing feelings.

4.3.2.2 *Recognising others' emotions*

Young people not living with partner/family and young people with LAC status scored significantly lower on recognition of all emotions through verbal prosody and facial expressions. This reached significance for recognition of anger (VEPR and FER 100% intensity) and fear (FER 50% intensity) for young people not living with partner/family and VEPR total, VEPR fear and FER sadness scores (at 50% intensity) for young people with LAC status. In support of these findings, similar to the alexithymia research, factors such as parental conflict and family break-down (Bradley & Corwyn, 2002; Pollak *et al.* 2009), abuse and neglect (Pollak & Sinha, 2002), attachment style and mood (Schmid & Schmid, 2010)

are also reported to impact on emotion recognition ability and previous research reports young people with LAC status show decreased ability to recognise others' emotions (Barone & Lionetti, 2012; Pears & Fisher, 2005). These findings have also recently been replicated with a South Wales sample of young people with LAC status (Hollingworth, 2014).

4.3.2.3 *Perceived social support*

Unsurprisingly, young people not living with family/partner and young people with LAC status reported significantly lower levels of perceived social support, in particular from family. These findings support previous research indicating that young people with LAC status have often experienced high risk family backgrounds of deprivation, poor parenting, abuse and neglect, which are reported to adversely affect healthy attachments (Biehal *et al.* 2010) and internal working models and beliefs (Mikulincer *et al*., 2003), future availability of socially supportive relationships (Ma, 2006) and feelings experienced at receiving support (Sarason *et al.* 1990). Additionally, Thompson *et al.* (2006) suggest that young people with adverse life experiences who are in emotional turmoil may be less capable of viewing other people as sources of available support.

4.3.3 Gender (matched across the two groups)

4.3.3.1 *Gender and offence type, frequency and severity*

The current study is the first of all reviewed emotion recognition studies to include both male and female YPwO. Gender was matched across the two groups. An analysis of the YPwO subgroups showed no significant difference between male and female YPwO in number of offences, or offence severity, but significantly more females YPwO reported to have committed violent offences than male YPwO. These findings are not supportive of research reporting that relative to males, females (re-)offend less and commit less severe and less violent offences (Becker & McCorkel, 2011; Fergusson & Horwood, 2002; Harrington *et al.* 2007; Marcus, 2009). Having said that, the current sample only included a small sample of females. Furthermore, some research suggests that girls are less likely than boys to get arrested and charged, therefore possibly biasing female offending frequency, severity and type (Cauffman, 2008).

4.3.3.2 *Alexithymia*

As a whole group, relative to females, males showed significantly lower levels of alexithymia, particularly less difficulty identifying and describing feelings. Females were also more likely to meet clinically significant levels of alexithymia than males. YPwO subgroup analysis also showed that, relative to female YPwO, male YPwO showed significantly lower levels of alexithymia, particularly less difficulty identifying and describing feelings. These findings are

consistent with previous adolescent studies, which report that significantly more females than males meet the clinical level for alexithymia (Honkalampi *et al.* 2009; Mason *et al.* 2005).

This gender pattern of alexithymia amongst younger people has been found to alter as they enter adulthood, with research indicating that adult men show significantly higher levels of alexithymia than adult women (Honkalampi *et al.* 2000; Kokkonen *et al.* 2001 Levant *et al.* 2009; Mattila *et al.* 2006; Salminen *et al.* 1999). Therefore, it might be proposed that Levant's Normative Male Alexithymia hypothesis is more applicable to adult males, whereby males are discouraged through societal views and interactions to express their feelings, subsequently affecting their emotional awareness and vocabulary. One might also propose an evolutionary explanation for this age-related increase in alexithymia amongst males, whereby survival demands men to unhook from internal signs in order to take risks, source food and protect.

The higher prevalence rates of alexithymia amongst younger females might be explained by Levant's Normative Male Alexithymia hypothesis. For example, being socialised differently to the experience of emotions might lead young males and females to compare themselves to different expectations and standards (Kokkonen *et al*., 2001) and result in different tendencies to report difficulties; women might be more likely to (mis)report greater difficulty identifying and describing their feelings than men, as a result of comparing themselves to cultural standards (Salminen *et al.* 1999).

4.3.3.3 *Recognition of others' emotions*

The sociocultural explanation for gender differences in alexithymia also supports research indicating that females are predominantly better at FER than males (McClure, 2000). The current study supported these findings with whole group analysis showing that males scored lower than females on recognition of all facial emotional expressions, reaching significance for recognition of happiness (100% intensity), sadness (50% intensity) and anger (75% intensity). YPwO subgroup analysis showed that male YPwO scored significantly lower than female YPwO on recognition of sadness (25% intensity) and anger (75% intensity). Whole group comparison showed that mean recognition scores were also higher amongst females than males for all VEPR (except for anger), although this difference did not reach significance. YPwO subgroup analysis of VEPR revealed that male YPwO scored significantly lower than female YPwO on recognising happiness. As noted, these findings could be explained by girls being exposed to more expressive environments than boys and being more encouraged to recognise emotions (Mancini *et al.* 2013).

4.3.3.4 *Perceived social support*

Amongst the group as a whole and amongst YPwO specifically, no significant gender differences were found in levels of perceived social support. The lack of association between gender and social support identified in the current sample does not support adolescent research indicating that females report higher levels of social support than males (Bruwer *et al.* 2008; Ramaswamy *et al.* 2009). These findings might be partially explained by the small number of female participants recruited. Future research would help support or refute this suggestion.

4.3.4 Academic grades and qualifications (matched across the two groups)

4.3.4.1 *Alexithymia*

Compared to young people with A-C grades, young people with D-fail grades showed significantly more difficulty describing feelings. These findings support previous research reporting a relationship between alexithymia and educational attainment (Joukamaa *et al.* 2003) and reading and verbal ability (Kokkonen *et al.* 2003; Way *et al.* 2007). Similarly, previous research has reported that individuals with clinical levels of alexithymia have significantly lower levels of education than participants with lower alexithymia scores (Honkalampi *et al.* 2000; Kokkonen *et al.* 2001; Mattila *et al.* 2006; Salminen *et al.* 1999) (studies measured educational levels by years of education or compulsory, secondary, higher education or secondary school graduates versus non-graduates).

4.3.4.2 *Recognition of others' emotions*

In relation to recognition of others' emotions, compared to young people with A-C grades, young people with D-fail grades showed reduced VEPR and FER ability across all emotions, reaching statistical significance for scores on VEPR overall, recognition of happiness through facial (75% and 100% intensity) and verbal expressions and anger through facial expressions (at 75% intensity). In relation to qualifications, relative to young people with ≥ 5 GCSE's, young people with ≤ 4 GCSE's also showed reduced VEPR and FER ability across all emotions, reaching significance for recognition of facial happiness (75% and 100% intensity). These findings indicate that academic grades, appear to be capturing a factor more significantly/closely related to recognition of others emotions, than academic qualifications.

Whilst recognising that the current study did not formally assess cognitive ability, the above findings are in line with previous research reporting that cognitive and verbal ability are related to FER ability (Barchard & Hakstian, 2004; Herba & Phillips, 2004; Mitchell, 2007; Moore, 2001). Similarly, studies measuring the ability of YPwO to recognise others' emotions

have reported confounding variables of verbal intelligence, education (Gonzalez-Gadea *et al.* 2014; Jones *et al.,* 2007; Savitsky & Czyzewski, 1978) and IQ scores (Sato *et al*., 2009) on FER ability.

The relationship between cognitive/ verbal ability and VEPR ability has not attracted a consensus (Wells & Peppe, 2003). The current study provides some evidence for the impact of educational grades on VEPR in YPwO, which might be explained by lower language ability (Weinert, 1992). An alternative interpretation might be that VEPR difficulties contribute to doing less well educationally.

4.4 Main study findings related to previous research

4.4.1 Alexithymia

The prevalence of clinically significant levels of alexithymia, using the TAS-20 cut off (≥61), for the sample as a whole (39%), YPwO (50%) and the control group (28%) is notably higher than the 6.9% to 15.9% reported in adolescent and young adult studies in Finland, Italy and New Zealand (Garisch & Wilson, 2010; Honkalampi *et al.* 2009; Joukamaa *et al.* 2007; Karukivi *et al.* 2010; Montebarocci *et al.* 2004; Säkkinen *et al*. 2007). This indicates that this South Wales sample shows higher levels of alexithymia than young people in other countries. British cultural values of a 'stiff upper lip' may contribute to children and young people being less exposed to emotional language, essential for emotional skill development (Taylor *et al.* 1997; Wallin, 2007). Higher prevalence rates of alexithymia in the current sample in comparison to other groups in the general population may also be contributed to by a number of other demographic factors, such as psychological, social and learning environments (see section 1.3.4). Taken together, higher prevalence rates in the current sample compared to other studies with young people emphasises the need for more locally-based research.

In concordance with the current study, in a Swiss sample of participants, Zimmerman (2006) also reported higher prevalence rates of alexithymia amongst YPwO (47.2%), than the control group (21.7%). Prevalence rates aside, mean TAS-20 total, DDF and DIF subscale scores were higher in the YPwO group than in the control group, although these differences did not reach significance, failing to provide support for hypothesis three. Non-significant findings are consistent with previous research reporting higher alexithymia scores in YPwO than a comparison group, not reaching significance (Möller *et al.* 2014; Moriarty *et al.* 2001). However, these findings are not consistent with the study conducted by Zimmermann (2006), who reported that YPwO showed significantly higher TAS-20 and TAS-DIF scores.

Of note, there were no significant differences in age, TAS total and subscale scores between the YPwO sample from the current study and Zimmermann's (2006) study. Moreover, initial t-tests (with and without outliers) conducted with the current sample, indicated that YPwO showed significantly more difficulty identifying and describing feelings (see Appendix H). This suggests that confounding variables might contribute to the discrepancy between findings from the current study and those reported by Zimmermann (2006). In particular, attention might be drawn to the current study controlling for LAC status, which was significantly related to difficulty identifying and describing feelings; a variable not controlled for in the study conducted by Zimmermann (2006).

Unexpectedly, in comparison to the YPwO group, the control group reported significantly higher levels of externally orientated thinking. However, the validity of the EOT subscale has received considerable criticism, described as satisfactory and moderate (Parker *et al.* 2003, 2010; Säkkinen *et al.* 2007), and reliability has been questioned (Kooiman *et al.* 2002; Taylor *et al*. 2003). Indeed, evaluating TAS-20 psychometric properties with a sample of adolescents, Zimmermann *et al.* (2007) described internal reliability for the EOT as poor.

The current study was the first to also investigate alexithymia within subgroups of the YPwO, including number of offences (≤3 offences and ≥4 offences), offence type (violent and non-violent) and offence severity (low and high). In relation to number of offences and offence severity, no significant between group differences were identified in levels of alexithymia. However, in relation to offence type, 'violent' YPwO showed significantly lower levels of alexithymia overall and externally oriented thinking, than 'non-violent only' YPwO.
These findings are unexpected, as alexithymia has been associated with a reduced ability to regulate one's emotions, increasing the risk of violence expression of emotional states (Nehemiah *et al.* 1976; Fossati *et al*. 2009) and offending behaviour (Fonagy, 2003). Furthermore, these findings contradict previous research by Möller *et al.* (2014), who reported that, although not statistically significant, young people with violent offences scored higher on TAS-20 total and subscale scores.

Attention needs to be drawn to the findings by Möller *et al* (2014) being statistically non-significant, and findings from the current study reaching significance at the 95% confidence level in the context of multiple comparisons. A number of factors might contribute to explaining the discrepancy between the current findings and findings reported by Möller *et al.* (2014). First and foremost, the current study categorized YPwO according to self-reported offences, whereas Möller *et al.* (2014) categorized according to service offending records. The current study allocated YPwO into the violent group, if any reported offence was violent

in nature, whereas Möller *et al* (2014) allocated participants to each group based on whether the *principal* offence was classified as violent or non-violent. Furthermore, Möller *et al.* (2014) recruited older participants (aged 18-21) from a prison, as opposed to the community, did not control for confounding variables and participation was reported to possibly be stressful, which may have led to response bias.

4.4.2 Recognition of others' emotions

4.4.2.1 *Verbal emotional prosody recognition (VEPR)*

Partially supporting hypothesis 4, YPwO showed significantly lower accuracy in recognising the negative emotion of fear, but not of anger or sadness, through verbal prosody. No previous studies are known to have examined VEPR with a non-clinical adolescent or YPwO sample, so there is little relevant research to compare these results with. The findings of the current study are consistent with a review of the literature with adult forensic samples (Bagley *et al.* 2009; Blair *et al.* 2002; Mitchell *et al.* 2006; Suchy *et al.* 2009) and pupils attending schools which support social, emotional and behavioural needs (Blair *et al.* 2005; Stevens *et al.* 2001), which all concluded that these participant groups present with a specific deficit in recognising fear from vocal cues (Dawel *et al.* 2012). Although these studies were not completed with YPwO, it might be hypothesised that these samples present with similar social, emotional and cognitive regulation difficulties and are likely to have experienced adverse early relationships and events.

Previous studies suggest that difficulties in recognition of fear in others are likely to be a result of a neurological dysfunction based in the amygdala (Adolphs & Spezio, 2006; Phelps & LeDoux, 2005), as a result of early adverse experiences and biological factors (Fox *et al.* 2010; Young & Carter, 2007; Young *et al.* 2007). Indeed, amygdala dysfunction has been evidenced with young people who present with anti-social behaviours (van Goozen *et al.* 2007; Passamonti *et al*. 2010).

4.4.2.2 *Facial Emotion Recognition (FER)*

Significant main effects of intensity were found for all emotions, suggesting that successful emotion recognition depended on intensity of the facial emotional expression. These findings are consistent with the few studies that have considered intensity of facial emotion expressions, reporting that greater intensity of facial expression facilitates greater accuracy in emotion recognition (Herba *et al.* 2006; Montirosso *et al.* 2010). These findings were also recently reported in a Welsh sample of YPwO (Bowen *et al.* 2013).

No significant differences were found between YPwO and the control group in total scores for FER of happiness, sadness, fear or anger, therefore failing to support hypothesis five. These findings are consistent with previous FER ability studies in YPwO (Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014; Jones *et al*., 2007; McCown *et al.* 1988; Sato *et al.* 2009; Savitsky & Czyzewski, 1978), although a number of these studies report YPwO did score significantly lower on FER of disgust (Jones *et al.*, 2007; Sato *et al*., 2009).

However, when using a more context sensitive measure, Gonzalez-Gadea *et al.* (2014) reported that YPwO showed significantly lower emotion recognition scores than controls, even when controlling for age and education. Measuring recognition scores of emotions at different intensities has also been reported to be more realistic to everyday situations (Herba *et al.* 2006). Measuring FER using a emotional expression of varying intensities, Bowen *et al.* (2013) reported that, relative to controls, YPwO were significantly worse at identifying sadness, low intensity anger and high intensity fear.

However, despite using a measure including various emotion intensities and participants from a similar geographical area as Bowen *et al.* (2013), the current study failed to find any statistical difference in YPwO and control groups in their recognition of emotions at different intensities. The discrepancy in findings between the current study and that conducted by Bowen *et al* (2013) might be explained by a number of factors. Firstly, Bowen *et al.* (2013) presented participants with 150 slides, which might have contributed to participant fatigue, and exacerbated between group differences. Evidence of participant fatigue in the study by Bowen *et al.* (2013) might be reflected in the mean FER scores being much lower in their study than those in the current study. Lower FER scores might also be a reflection of the overall sample being significantly younger in the study by Bowen *et al.* (2013) than the sample used in the current study. Findings suggest that younger adolescents are still developing emotion recognition ability (Mancini *et al*., 2013) and might not have fully developed the ability to successfully draw on configural properties (the position and distance between facial features and intensity of expression) to interpret emotion (De Sonneville *et al.* 2002; Leder & Bruce, 1996). Lastly, initial t-test analysis of the current sample showed significant between group differences in overall FER scores, with ($p<.01$) and without outliers ($p<.02$) (see Appendix H). These differences were no longer identified when controlling for LAC and accommodation status, factors which Bowen *et* al (2013) did not control for.

A significant between group difference was found in FER of neutral ($p<.001$), with YPwO scoring significantly lower than controls. Of reviewed studies examining FER in YPwO, only one study measure neutral FER, which was not significantly different between groups

(Bowen *et* al, 2013). FER neutral incorrect scores were most accounted for by incorrect selection of sadness scores for both groups. These might be supportive of negative attribution theory, whereby YPwO are more likely to make negative interpretations of another's emotions and intent (Crick & Dodge, 1994; Dodge, 2006), although this attribution was found in both groups.

4.4.2.3 *YPwO subgroup findings*

In relation to the sub-groups of YPwO (number of offences, offence severity and offence type), no significant between group differences were identified in levels of recognition of others' emotion through facial or verbal prosody expressions. Lack of between group difference in FER according to offence severity is out of line with findings reported by Bowen *et al.* (2013) who reported that, relative to YPwO with low severity offences, YPwO with high severity offences were significantly worse at identifying low intensity anger, but significantly better at recognising high intensity anger. Of note, differences reported by Bowen *et al* (2013) reached significance at $p<.05$ and discrepancy in findings between the current study and those reported by Bowen *et al* (2013) are likely to be explained by factors noted above.

4.4.3 Relationship between FER and VEPR

In support of hypothesis 2c, a significant positive correlation was found between FER total and VEPR total scores for the sample as a whole and for each group separately. Examining the correlations between FER and VEPR subscales also revealed significant correlations between the majority of subscales. This indicates that there is a strong association between ability to recognise emotions through facial expression and ability to recognise emotions through verbal prosody. Although these findings are the first to be reported with a YPwO sample, they are consistent with a body of previous research, reporting a relationship between FER and VEPR (De Gelder & Vroomen, 2000; Mill *et* al. 2009; Pell, 2005; Rigoulot & Pell, 2012, 2014). Furthermore, these findings are supportive of neurological research positing that paralinguistic communication is primarily processed in the same brain regions, with the ventral prefrontal, the anterior insula and the amygdala being particularly important regions for the identification and processing of emotion-related information from facial and vocal expressions (Adolphs, 2006; Calder *et al.* 2001; Mill *et al.* 2009; Lawrence *et al.* 2007; Ochsner, 2004; Phelps & LeDoux, 2005).

4.4.4 Relationship between alexithymia and recognition of others' emotions

Failing to support hypotheses 2a and 2b, no significant correlation was found between ability to recognise emotions through facial or verbal prosody and alexithymia in the group as a

whole. When running the analysis separately for each group, no significant correlation was found between FER and alexithymia although, in support of the hypothesis, a negative correlation was found between VEPR total scores and TAS-20 scores ($p<.05$) (in the control group only), VEPR of happiness and Difficulty Identifying Feelings ($p<.05$) (in whole group analysis and control group only in separate group analysis) and VEPR of sadness and Externally Oriented thinking (in whole group analysis only). Taken together, these findings indicate that lower levels of alexithymia are associated with higher ability to recognise emotions through verbal prosody, particularly in young people without a known offending history. This is supportive of previous research reporting a relationship between emotion recognition and alexithymia with non-offending populations (Cook *et al.* 2013; Grynberg *et al.* 2012; Jongen *et al.* 2014; Lane *et al.* 1996, 2000; Mann *et al.* 1994; Parker *et al.* 1993; Parker *et al.* 2005; Swart *et al.* 2009; Prkachin *et al.* 2009; Vermeulen *et al.* 2006). This relationship between VEPR, and not FER, with alexithymia might be caused by verbal emotional prosody being more difficult to recognise than facial emotional expressions (Gill *et al.* 2014; Scherer *et al.* 2011).

Unexpectedly, a significant whole group positive correlation was found between FER total scores and TAS-EOT subscale scores (r (98)= .20, $p<.05$), indicating an association between ability to recognise emotions through facial expressions and high levels of externally oriented thinking. This should, however, be interpreted with caution, as no significant correlation was found for any specific facial emotions and the TAS-EOT subscale. Furthermore, when two-tailed tests of bivariate correlations for this significant correlation was run separately for the YPwO group and the control group, no significant correlations were found.

Further unexpected findings include the significant positive correlations between VEPR total scores and TAS-20 scores and FER total scores and TAS-20 scores in the YPwO group only, which indicates that higher levels of alexithymia are associated with higher ability to recognise emotions through facial and verbal prosody expressions amongst YPwO. Considering a correlation was found for both FER and VEPR with alexithymia, findings are less likely to be due to a type-one error caused by the large number of analyses completed and future research would help establish whether these findings are replicated.

Thus, positive relationships were found between FER ability and externally oriented thinking in the whole group and between VEPR/FER ability and alexithymia in YPwO. In line with the hypothesis, a negative relationship was found between alexithymia and VEPR ability, but not FER ability, in the control group only.

Discrepancy in findings might be due to a number of factors. For example, unlike the current study, previous studies researching alexithymia and emotion recognition included temporal constraints (Jongen *et al.* 2014; Parker *et al.* 2005; Swart *et al.* 2009). It has been suggested that without time constraints individuals with alexithymia are able to correctly label others' emotions by relying on information related to the visual configuration of the facial expression rather than affective cues; a cognitive processing technique which is less successful under time constraints (Ihme *et al.* 2014a, 2014b; Jongen *et al.* 2014). Indeed, Ihme *et al.* (2014b) reported that those with higher levels of alexithymia showed longer response times in an FER task than those with lower levels of alexithymia. Future research might consider employing temporal constraints to establish whether these findings would be replicated in YPwO. Furthermore, many previous studies reported on between group differences in emotion recognition by categorising participants into groups of alexithymics and non-alexithymics, which is likely to have increased significance of results, specifically considering some studies purposely sampled participants with higher alexithymia scores (e.g. Swart *et al.* 2009). Previous reports of significant emotion recognition differences between high and low alexithymics also included perceptual constraints (varying emotion intensities) (Cook *et al.* 2013). Further inferential statistical analysis of correlations between alexithymia and low versus high intensity facial emotional expressions might support or dispute these findings. However, this analysis was not completed for the current study, because the main study focus was on offending versus non-offending behaviour and outcome variables. Unlike the current study, previous research has also not investigated the relationship between alexithymia subscales and recognition of others' emotions. Lastly, all previous research has studied the relationship between alexithymia and recognition of others emotions with healthy adults and not with young people specifically or with YPwO, so previous research might not be comparable to the client group of the current study, emphasising the need for further exploratory research with this client group.

4.4.5 Perceived social support

In support of previous research revealing high levels of social support needs of YPwO (Chitsabesan *et al.* 2006; King *et al.* 2014), findings from the current study showed that mean scores of perceived social support were lower amongst YPwO than the control group. However, failing to hypothesis six, these differences did not reach significance (controlling for LAC status for MSPSS total and MSPSS family and therapy status for MSPSS family), which might be due to YPwO, more so than controls, wanting to present as socially acceptable (Hardan-Khalil & Mayo, 2015). Subgroup analysis in the YPwO sample in relation to the number of offences committed and offence severity, also revealed no significant between group differences in levels of perceived social support. In relation to offence type,

relative to 'non-violent only' YPwO, 'violent' YPwO reported higher levels of social support from friends, but lower levels of social support from a significant other person.

Despite not finding significant differences in levels of perceived social support between YPwO and the control group, and 'violent' YPwO reporting higher levels of perceived social support from friends than 'non-violent' YPwO, these findings should be interpreted in context. For example, increased levels of perceived social support can lead to negative outcomes, as context, source and dimensions of support, especially qualities possessed by those providing support, are likely to affect support outcome (Leach, 2015). Social support can reduce one's perceived level of self-efficacy (Reinhardt *et al.* 2006; Chen & Feeley, 2012) and create feelings of guilt, anger, or shame at receiving assistance (Sarason, 1990). Negative outcomes may also be dependent on the receiver's attachment style (Bartholomew *et al.* 1997) and receivers' sense of the providers' level of empathy (Faulkner & Layzell, 2000), factors which are thought to be different amongst YPwO than young people without a known offending history. Amongst YPwO specifically, previous research suggests that YPwO appear to experience a number of personal and sociocultural barriers to using social support for positive outcomes (King *et al.* 2014; Walsh *et al*. 2011). Furthermore, a significant positive correlation between having caring friends and offending has also been found (Salvatore & Markowitz, 2014), likely to be attributed to social support being erratic and unpredictable in nature (Colvin *et al.* 2002) and support networks being criminally embedded (Clear *et al.* 2001), causing temptations and opportunities to re-offend (Martinez & Abrams, 2013).

4.4.6 Relationship between emotion recognition and perceived social support

4.4.6.1 *Alexithymia and perceived social support*

Supporting hypothesis 1a, a significant negative correlation was found between alexithymia and perceived social support, indicating that increased alexithymia is related to reduced perceived social support, although TAS-20 total and MSPSS total score correlations were not found for each group separately. More significant correlations were found for the sample as a whole and each group separately when examining the relationship between TAS and MSPSS subscales. Findings indicated that young people with higher levels of difficulties identifying feelings, experienced lower levels of perceived social support overall (for the group as a whole and for the YPwO and control group separately) from family (for the group as a whole and for the YPwO and control group separately), and from friends (for the group as a whole and for the control group). These findings are supportive of previous research indicating that alexithymia is related to lower levels of perceived support (Lumley *et al*. 1996b; Karukivi *et al.* 2011). Like the current study findings, previous research also indicates

that perceived social support from friends is significantly correlated with TAS-20 scores (Karukivi *et al.* 2011, 2014).

Of note, in addition to difficulty identifying feelings, difficulty describing feelings is also reported to be significantly correlated with reduced levels of perceived social support, which was not found in the current study. Furthermore, findings from the current study revealed more significant correlations for the group as a whole and for the control group, than for the YPwO sample, suggesting that confounding variables might mediate the relationship between alexithymia and perceived social support for young people with an offending history.

4.4.6.2 *Recognition of others' emotions and perceived social support*

Supporting hypothesis 1b, a significant positive correlation was found between VEPR total and MSPSS total scores and FER total and MSPSS scores, indicating that improved ability to recognise others' emotions is associated with higher levels of perceived social support. Several significant whole group positive correlations were also found between subscales, such as VEPR/FER total and happy with perceived social support from family; VEPR fear with perceived social support from friends and MSPSS total with VEPR sad and fear (all $p<.05$). These findings are explained by previous supporting research positing that recognition of others' emotions plays an important role in social interaction (Stone & Nielsen, 2001; Erickson & Schulkin, 2003), social functioning and peer relationships, with deficits likely to have a negative effect on these relationships (Collin *et al.* 2013). Of note, however, when correlational analysis was run separately for each group in the current sample, significant correlations were not identified between any VEPR, FER and MSPSS scores, suggesting that the whole group correlations need to be interpreted with caution and future research with young people is required to establish whether the relationship between ability to recognise others' emotions and perceived social support is replicated.

4.5 Strengths and limitations

4.5.1 Strengths

From the review of the literature, YPwO appear stuck in an inter-related cycle of adverse life experiences, reduced social support and deficits in emotional skills (see Figure 1.8). Yet, neither these needs, nor their complex interplay, have been extensively researched with YPwO to effectively inform policy and practice. Specifically, alexithymia has not been examined with a British sample of YPwO, VEPR ability has not been examined with YPwO, only two UK studies have examined FER ability in YPwO, (of these, only one was completed

with a community sample of YPwO), no quantitative studies have examined perceived social support in YPwO, no studies have measured alexithymia *and* ability to recognise others' emotions in YPwO, and no studies have examined emotion recognition *and* perceived social support in YPwO. Thus, the current study has built on previous research by examining alexithymia, emotion recognition (via the two modalities of facial and verbal prosody expression) *and* perceived social support amongst YPwO. Specifically, the current study is the first known study to examine: i) Alexithymia with a British sample of YPwO; ii) Perceived social support with YPwO using quantitative methods; iii) Verbal emotional prosody recognition with YPwO; iv) Verbal emotional prosody recognition *and* social support; v) Alexithymia *and* recognition of others' emotions in YPwO; and vi) Emotion recognition *and* perceived social support in a British sample and with YPwO

Despite previous studies reporting on offending type (violent and non-violent) in relation to alexithymia (Möller *et al.* 2014) and facial emotion recognition (Carr & Lutjemeier, 2005), and offending severity in relation to facial emotion recognition (Bowen *et al.* 2013), the current study is also the first to have examined the above variables in three different subgroups of YPwO, according to offence type, frequency and severity. An additional strength of this research is that, unlike most previous research examining emotion recognition in YPwO, participants were matched according to age, gender, ethnicity, qualifications, grades and SES. Furthermore, unlike any previous emotion recognition in YPwO studies, this study recruited female YPwO too, therefore increasing the likelihood that the sample was representative of the target population.

Another particular strength of the current research is that it focused primarily on psychological constructs and reported behaviours, rather than psychiatric diagnoses. The introduction of this thesis noted that research and services for YPwO's emotional and psychological needs are often medically driven and organised around psychiatric diagnosis (Preston *et al.* 2015), with a large body of forensic research oriented around diagnostic labels such as psychopathy, conduct disorder and callous unemotional traits. Aside from the clinical and ethical dilemmas of adopting this stance (see section 1.2.4), the use of psychiatric diagnosis in research has been suggested to limit interpretation and generalisability of research findings. For example, the use of psychiatric diagnosis gives rise to clinical heterogeneity among groups (Zimmerman *et al*. 2012), the diagnostic process lacks reliability (Frances, 2012; Zimmerman *et al*. 2010) and a diagnosis is often characterised by high levels of comorbidity (Frances, 2012). With this in mind, examining the relationship between emotion recognition or perceived social support with certain psychiatric diagnoses would reveal very little about which specific difficulties, related to that diagnosis,

emotion recognition is related to. It is recommended that instead of focussing on psychiatric diagnosis, research should examine defined psychological traits, because this will yield more valid associations (Panksepp, 2006) and lead to a better understanding of the precipitating and perpetuating factors for psychological and emotional problems (Coghill & Sonuga-Barke, 2012).

4.5.2 Limitations

4.5.2.1 *Measures*

The reliance of self-report measures to gather demographic and offence information and levels of alexithymia and perceived social support could be considered as a limitation. Self-report measures are prone to potential bias (Gore, 1981) such as demand characteristics (Orne, 1962), although other researchers suggest self-report measures accurately measure constructs such as mood, attitudes and beliefs (Nisbett & Wilson, 1977), if the tool sufficiently measures the construct of interest (Haeffel & Howard, 2010).

Although the self-report measures selected are widely used in peer reviewed literature and the TAS-20 is considered appropriate as a lone assessment where resources for observer assessments are unavailable (Taylor *et al.* 2000), a multi-method approach to measuring alexithymia is recommended, especially with younger participants (Lichev *et al.* 2014; Lumley *et al.* 2005), because developing language and cognitive skills of younger populations are suggested to affect self-report quality (Borgers *et al.* 2000; Marsh *et al.* 2005). In addition, self-report measures require insight in order to accurately report difficulties (Lundh *et al.* 2002) and young people with high levels of alexithymia might be unable to evaluate themselves correctly because of their difficulties in cognitive processing of emotions (Lane *et al.* 1997). Self-report might also have led to under-reporting of offences committed, whereby some participants might not have been clear about or remember the reasons for their arrest or the exact nature of their offence. Therefore, future research might use service records to more accurately gather offence data.

Despite the MSPSS being considered a reliable measure and the fact that it has been validated with young people (Bruwer *et al.* 2008, Canty-Mitchel & Zimet, 2000; Ramaswamy *et al.* 2009), it has not before been used with a YPwO sample and has been claimed to be associated with the general factor of perceived social support, rather than with the source-specific factors (family, friends, significant others) (Osman *et al.* 2014). Furthermore, social desirability, whereby participants may respond to items in order to appear socially acceptable, is considered a greater threat when administering instruments that are based on social constructs such as MSPPS (Hardan-Khalil & Mayo, 2015).

Recognition of others' emotions relies largely on cues from the person (facial expression, tone of voice) *and* contextual cues derived from the situation (e.g. crying at a wedding versus crying at a funeral) (Bird & Viding, 2014). However, the emotion recognition measures used in the current study only included cues from the person. Furthermore, the emotion recognition measures used in the current study were artificial in nature, completed under artificial circumstances, and included explicit emotion categorization to choose from, subsequently limiting ecological validity for real-life emotion recognition (Savitsky & Czyzewski, 1978; Gonzalez-Gadea *et al.* 2014). This is especially relevant, considering the proposal that YPwO might be less likely to be perceptive to emotion recognition when in a heightened state of arousal (McCown, 1988). In support of this idea, context specific measures, more accurately reflecting daily interactions, such as video-taped vignettes of daily interactions, have reported most significant results in studies completed with YPwO (Gonzalez-Gadea *et al.* 2014). It has also been noted that, unlike the current study, applying response time- limits or measuring response-times are likely to yield more detailed clues regarding the cognitive processes underlying expression recognition and more significant results (Sato *et al.* 2009).

4.5.2.2 *Confounding variables*

Despite participants being matched according to age, gender, ethnicity, qualifications, academic grades and SES and controlling for other variables, such as LAC, accommodation and therapy status, the current study did not screen for several other suggested confounding variables, which might have biased the results. The current study did not screen or control for social support confounding variables, such as self-esteem (Kaul & Lakey, 2003), depression, stress (Tanzer *et al.* 2013) and attachment styles (Bartholomew *et al.*, 1997; Ma, 2006), alexithymia confounding variables, such as low mood and life satisfaction (Honkalampi *et al.* 2000), nor confounding variables for the recognition of others' emotions, such as anxiety (Karukivi *et al.* 2010; Richards *et al.* 2002), attachment styles (Niedenthal *et al.* 2002; Schmid & Schmid, 2010) or mood (Schmid & Schmid, 2010). Furthermore, although the current study matched participants according to grades and qualifications, the FER confounding variables of cognitive and verbal intelligence (Barchard & Hakstian, 2004; Gonzalez-Gadea *et al.* 2014; Herba & Phillips, 2004; Jones *et al.* 2007; Mitchell, 2007; Moore, 2001; Sato *et al.* 2009; Savitsky & Czyzewski, 1978) was also not controlled for. Having said that, it has been suggested that cognitive and verbal IQ are likely to be significantly related to grades and qualifications (Mottus *et al.* 2012) and thus, controlling for education levels may indirectly control the effects of verbal or cognitive IQ. Nevertheless, future research should include measures of these variables in order to reduce the possibility of biased results.

4.5.2.3 *Sample*

Several factors may have impacted on the generalisability of the current findings. The current sample was restricted to young people from a suburban area in South Wales and therefore may not necessarily reflect the needs and presentations of young people in other areas and countries. Furthermore, given that YPwO were approached by the YOT to participate, it is possible that some YPwO were not invited to participate due to possibly being identified as unlikely to consider participation. All participants gave up their time and were willing to engage in the study, which may not accurately represent the populations they were sampled from.

Adequate understanding of the emotional labels was not established prior to interview, although studies completed with YPwO that have done so as part of study procedure (e.g. Sato *et al.* 2009), have reported that participants had no difficulty. Participation required a certain level of cognitive functioning, although every effort was made to include participants with attention and reading difficulties, by adapting the questionnaires to include visual and audio prompting, Considering that 20%-25% of YPwO have an IQ below 70, and a further 30% could be defined as having a borderline learning disability (Chitsabesan *et al.* 2006; Harrington *et al.* 2005), the current findings may only represent the findings for YPwO and other young people above a certain level of functioning. Findings might be different for young people with a lower level of functioning. Furthermore, although every attempt was made for participants to complete the experiment under stress-free conditions and every effort was made for the questionnaire to be short and engaging, some participants might have experienced fatigue or felt particularly stressful that day, which might have led to standardization failure, and shortcoming in the data collected (Osborne, 2013).

Relying on the control group to self-report whether they had committed offences might have caused sampling error Osborne (2013), whereby some participants in the control group might have failed to disclose a criminal offence. Furthermore, the majority of participants were of low socio-economic status, which has been found to be related to impaired ability to accurately report on feelings and characteristics using self-report questionnaires (Leventhal & Brooks-Gunn, 2000). A sampling issue relevant to violent versus non-violent subgroup analysis is raised by Möller *et al.* (2014), who suggested that offences reported by the YPwO might not be representative of their ‘criminal career’, whereby the YPwO might not yet have ‘specialised’ in performing certain types of crimes and therefore may not show significant patterns related to certain ways of emotional and social functioning.

4.5.2.4 *Methodological design*

As the current study had a cross-sectional design, causal conclusions between variables cannot be drawn, but only hypothesised. Broadly speaking, the mentalisation model, the taxonomic model of offending and the ACE body of research all predict that adverse childhood experiences and relationships are likely to interfere with the development of cognitive, emotional skills and social needed for effective daily functioning. The current study provided support for the notion than LAC status is related to emotional skill deficits and social support difficulties. Mediational analysis might have helped gain a more detailed picture of the relationships between alexithymia, emotion recognition in others and perceived social support. Furthermore, a causal relationship between factors can be inferred with greater confidence in studies with longitudinal design, such as the ACE study.

4.5.2.5 *Statistical analysis*

The analysis of the current sample included multiple comparisons, increasing the likelihood that significant findings are a result of type 1 error and the null hypothesis was incorrectly rejected. For example, at 95% confidence level, one would expect to find a significant effect every 20 comparisons made by simple chance. Several findings were significant at $p<.05$ and should therefore be interpreted with more caution than findings which reached significance at $p<.01$ or $p<.001$.

4.6 Summary

Demographically, males showed significantly lower levels of alexithymia, particularly less difficulty identifying and describing feelings. Females were also more likely to meet clinically significant levels of alexithymia than males. On the other hand, females were more able to recognise others' emotions through facial and verbal prosody expressions (particularly in recognition of FER sadness and anger). Compared to young people with A-C grades, young people with D-fail grades showed significantly more difficulty describing feelings and significantly more difficulty in recognition of emotions through verbal prosody expressions, and in particular, happiness through facial (75% and 100% intensity) and verbal expressions and anger through facial expressions (at 75% intensity).

Examining the relationship between alexithymia, recognition of others' emotions and perceived social support, revealed significant relationships in support of most hypotheses. For example, significant relationships were found between the ability to recognise emotions through facial expressions and the ability to recognise emotions through verbal prosody expressions (in the sample as a whole and in each group separately), a significant

relationship was found between alexithymia and ability to recognise emotions through verbal prosody (in the control group only) and significant relationships were found between alexithymia and perceived social support and ability to recognise others' emotions (through verbal prosody and facial expressions) and perceived social support (in the sample as a whole).

YPwO presented with higher alexithymia scores (including difficulty identifying and describing feelings) and lower FER, VEPR and MSPSS scores, than controls. However, only a few significant differences were found. Relative to controls, YPwO showed higher alexithymia prevalence rates, significantly lower levels of externally orientated thinking and significantly lower levels of recognition of fear through verbal prosody expression and recognition of neutral emotional state through facial expression. Subgroup analysis of YPwO showed that, relative to 'non-violent' YPwO, violent' YPwO showed significantly lower levels of alexithymia (particularly externally oriented thinking) and significantly higher levels of social support from friends, but significantly lower levels of social support from a significant other person.

Of particular interest, analysis showed that LAC status, more commonly reported in the YPwO sample (38%) than control sample (4%), was the predominant factor associated with all outcome variables of alexithymia, FER, VEPR and social support. Specifically, relative to young people without LAC status, young people with LAC status showed significant emotional skill deficits, including reduced ability to identify and describe feelings, reduced ability to recognise sadness through facial expressions (at 50% intensity) and any emotions through verbal prosody (particularly fear), and reduced levels of perceived social support (particularly from family). It appears that LAC status, rather than offending status in isolation, is more associated with alexithymia, reduced ability to recognise others' emotions and reduced levels of perceived social support.

4.7 Theoretical implications

4.7.1 Developmental theories of emotional skills

Findings that young people with LAC status showed lower ability to identify and describe their own feelings and lower ability on the FER and VEPR measures, suggest that attachment theory and mentalisation theory (Fonagy, 1989) offer useful frameworks for understanding emotional skills difficulties experienced by this client group. Based on attachment theory, mentalisation theory proposes that early attachment difficulties (experienced by young people with LAC status) predispose emotional skills deficits, due to

children's internal states not being understood and labelled by others (Colle *et al.* 2011; Esposito *et al.* 2014; Fonagy, 2002; Fonagy & Luyten, 2009; Meins *et al.* 2002; Murray & Andrews, 2005; Wallin, 2007), resulting in a failure to mentalise. Furthermore, the current findings are supportive of Social Constructionist theories, which propose that social context is also crucial to emotional skill development, with factors such as socio-economic deprivation (likely to be experienced by LAC status and young people aged 14-18 not living with family/partner), related to emotion recognition deficits (Herba & Phillips, 2004; Joukamaa *et al.* 2007; Kokkonen *et al.* 2001).

4.7.2 Theories of offending behaviour

The current study also revealed that young people not living with family/partner/with LAC status showed specific difficulties in the ability to recognise negative emotions (sadness and anger through facial expressions, fear and anger through verbal prosody) and that YPwO showed significant difficulties in VEPR of fear. These findings are supportive of models of the Self to Other Model of Empathy (SOME; Bird & Viding, 2014) and the neurocognitive Integrated Emotion Systems model (IES; Blair, 2005) of offending behaviour explaining that early adverse experiences cause emotion recognition difficulties, especially of negative emotions. The IES and SOME theories propose that a reduced ability to recognise negative emotions, such as fear, leads to reduced feelings of punishment by others' fearful expressions, reducing the likeliness of an empathic response and inhibition of the behaviour that caused this distress (Meins *et al.* 2002; Murray & Andrews, 2005). This might explain why VEPR of fear was found in YPwO, as opposed to the control group in the current study.

The IES theory suggests that early adverse experiences and biological factors (Fox *et al.* 2010; Young & Carter, 2007; Young *et al.* 2007) cause a neurological dysfunction based in the amygdala, which leads to difficulties in recognition of fear (Adolphs & Spezio, 2006; Phelps & LeDoux, 2005). Indeed, amygdala dysfunction has been evidenced with young people with conduct disorder (Passamonti *et al*. 2010) and anti-social behaviour (van Goozen *et al.* 2007). However, further research is required to assess neurological deficits amongst offending samples specifically to provide support for the applicability of the IES theory to YPwO. Furthermore, unlike IES and SOME theory claims, the current study did not find YPwO showed significantly reduced ability to recognise all negative emotions through verbal prosody and the FER findings of the current study are not supportive of IES and SOME theory.

4.7.3 Theories of perceived social support (and offending)

4.7.3.1 *Integrated Model of Perceived Social Support*

Findings that young people with LAC status reported significantly lower levels of social support (particularly from family), are supportive of the Integrated Model of Perceived Social Support (IMPSS, Sarason *et al.* 1990). Also founded in a developmental framework, the IMPSS proposed that early attachment experiences, such as caregiver availability, responsiveness and acceptance (Bowlby, 1977, 1988; Epstein, 1980) shape an individual's sense of acceptance and later relationships. Incorporating the social-cognitive perspective, the IMPSS describes how these early experiences impact on every-day appraisal, memory of and attention to social support (Lakey & Cohen, 2000). Young people with LAC status have often experienced high risk family backgrounds of deprivation, poor parenting, abuse and neglect, adversely affecting healthy attachment experiences (Biehal *et al.* 2010) and internal working models and beliefs of other people (Mikulincer *et al*., 2003). This theoretical framework and accompanying research could help to explain why young people with LAC status in the current study reported lower levels of perceived social support.

4.7.3.2 *Relationship perspective and Cullen's Social Support Paradigm of offending*

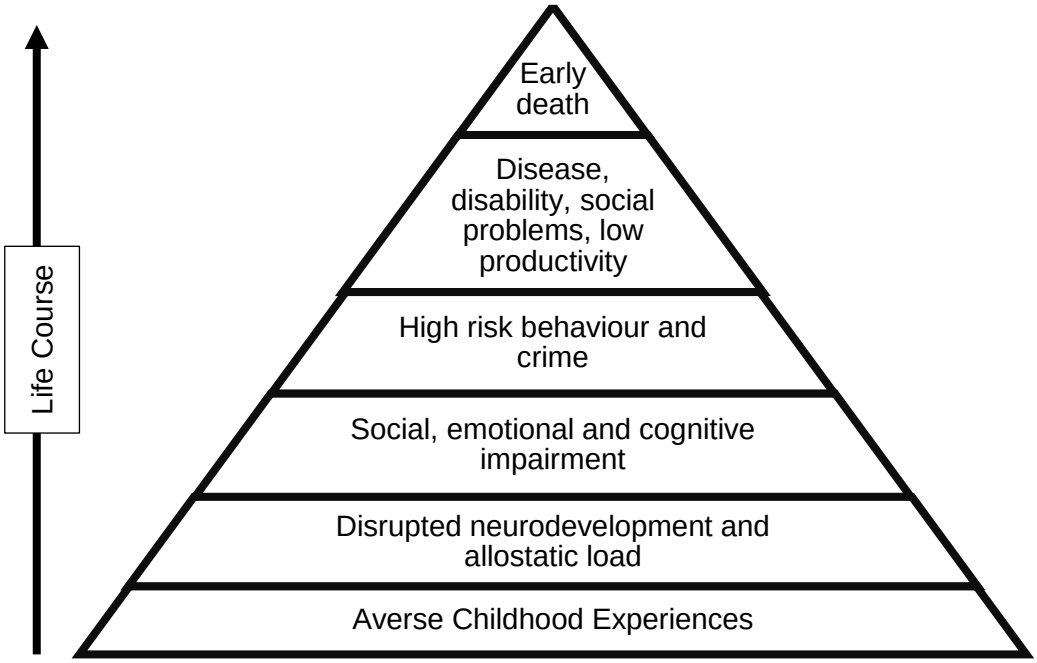
Findings that 'violent' YPwO reported significantly higher levels of perceived social support from friends than 'non-violent' YPwO, indicate that the Relationship Perspective (Reiss & Collins, 2000) and Cullen's Social Support Paradigm of offending (Cullen, 1994) provide helpful theoretical frameworks for understanding the outcomes of social support. These frameworks emphasise that social support cannot be separated from relationship processes and qualities, such as companionship and social skills (Sarason, 1974; Thompson *et al.* 2006), which ultimately affect social support outcomes. For example, similar to findings from the current study, previous research has also reported a significant positive correlation between caring friends and offending (Salvatore & Markowitz, 2014). The Relationship Perspective and Cullen's Social Support Paradigm are likely to explain these findings by proposing that these socially supportive friendships are erratic and unpredictable in nature (Colvin *et al.* 2002) and criminally embedded (Clear *et al.* 2001). Together, these factors are thought to assist young people in gaining knowledge, skills, connections, role models, a sense of belonging, and social status that promote success in offending (Cullen, 1994).

4.7.4 Integrative perspective

The significant relationships found in the current study between alexithymia and perceived social support, and recognition of others' emotions and perceived social support, are resonant with theoretical frameworks proposing that impaired ability to recognise and

understand emotions will adversely impact on healthy social relationships (Oately, 2004) and increase the risk of antisocial behaviours (Allen *et al.* 2008; Blair*,* 2005; Fonagy, 2003; Fossati *et al.* 2009). The most prominent findings from the current study appear to be as follows, i) a significant relationship between grades/qualifications and alexithymia, recognition of others' emotions and perceived social support ii) the significant relationship between LAC status and alexithymia, recognition of others' emotions and perceived social support and iii) the finding that 38% of YPwO had LAC status. These findings resonate with the taxonomic theory of offending (Moffitt, 1993), the developmental biopsychosocial model of conduct problems (Dodge & Petit, 2003), the developmental life course theory (Salvatore & Markowitz, 2014) and the recently published Welsh study (Bellis *et al.* 2015), indicating that adverse childhood experiences are risk factors of impaired social, emotional and cognitive functioning and offending (see Figure 4.1).

Figure 4.1: Model of ACE impacts across the life course (Bellis et al. 2015)



4.8 Clinical Implications

A recent joint publication by the Welsh Government (WG) and the Youth Justice Board (YJB) (WG/YJB, 2014) includes little information about emotional and psychological needs for young people who offend (YPwO), although WG and the YJB admit they need to do more to understand the complex interplay of factors leading a young person to offend and re-offend (WG/YJB, 2014) and declare a commitment to "ensure work with young people is as effective as possible, and based on research evidence" (YJB, 2008, p.3).

The results from the current study highlight the complex psychological, emotional and social needs of YPwO and, especially, young people with LAC status, suggesting a need to focus emotional and social support intervention towards young people with and without offending histories who are or have spent time in local authority or state care. The relationship between emotional skills and perceived social support suggests that multimodal, emotional skills *and* social support- promoting interventions might be considered optimal, although interventions focussed on either of these areas' are likely to impact the other. For example, oxytocin, which is released during socially supportive interaction, such as a pleasant conversation, a hug or even petting a dog (Olff, 2012), has been shown to increase recognition of others' emotions (Domes *et al.* 2007; Xu *et al.* 2015).

Considering the findings that lower academic grades and qualifications were significantly related to emotional skills, intervention should also focus on increasing verbal skills to support prosocial behaviour, which has been suggested to be particularly helpful when YPwO feel under threat (Savitsky & Czyzewski, 1978), helping young peple to "convert motor behaviour to verbal behaviour" (Marohn, 1990, p.426).

4.8.1 Emotional skills

As emotional skill deficits are related to reduced levels of emotions such as guilt, the Criminal Justice System's current approach of punishment and rehabilitation (Bowen *et al.*2013) to control offending behaviour is unlikely to be effective (Syngelaki *et al.* 2013). Emotion recognition deficits in YPwO with LAC status has important implications for policy and practitioners, with a redirected intervention focus on improving emotion recognition (Bowen *et al.* 2013; Carr & Lutjemeier, 2005; Gonzalez-Gadea *et al.* 2014; Zimmermann, 2006). A focus on emotional skills might be considered a priority considering the proposed impact of emotional skills on overall adaptive functioning (Bar-on & Parker, 2000; Schutte *et al.* 2002), academic achievement (Goetz *et al.* 2005), psychological well-being (Bar-on & Parker, 2000; Schutte *et al.* 2002) and anti-social behaviour (Allen *et al.* 2008; Blair, 2005; Fonagy, 2003; Fossati *et al.* 2009).

A number of cognitive interventions focused on emotion recognition have been shown to improve the behavioural and cognitive processes involved in emotion recognition, including improvements in empathy and behaviour amongst children (Dadds *et al.* 2012), reducing negative attribution biases amongst YPwO (Guerra & Slaby, 1990; Penton-Voak *et al.* 2013) and improving FER amongst YPwO (van Goozen *et al.* 2013). Similarly, mentalisation-based therapy (Bateman & Fonagy, 1999) has been evidenced to support the development of emotional skills (Wallin, 2007) and correct affect attribution bias (Sharp *et al.* 2013). These

positive outcomes are also likely to improve mood and social relationships and to reduce offending behaviour (Dadds *et al.* 2012; Penton-Voak *et al.* 2013).

Clinically, difficulties with emotional awareness and expression are likely to adversely impact the development of a therapeutic relationship (Mallinckrodt & Wei, 2005; Vanheule *et al.* 2007). More recently, the factors of emotions and social relationships have been incorporated into recommendations for emotion and relation-based interventions, which should be provided before any higher level cognitive intervention (van Goozen *et al.* 2013; Skuse & Matthew, 2015). Accordingly, psychotherapeutic approaches, such as emotion and attachment-based dialectical behaviour therapy (DBT; Linehan, 1993) and dyadic developmental psychotherapy (DDP; Hughes, 2006) are reported to be helpful for young people with LAC status and offending histories, by supporting improvement of their emotional awareness and regulation and skills to manage relationships and cope with stressful situations (Andrew *et al*. 2014; Hughes, 2006; Quinn & Shera, 2009). The current study also provides evidence for the recent introduction of the trauma-recovery model (TRM) in local South Wales YOT's. The TRM provides a staged framework to acknowledge and support YPwO to manage the impact of adverse childhood experiences and developmental trauma, by meeting basic needs and building relationships and emotional awareness before skills building (Skuse & Matthew, 2015).

4.8.2 Perceived social support

Research evidence indicates that social support is one of the most powerful psychosocial benefits to physical health (Anderson *et al.* 2006, 2007; O'Donovan & Hughes, 2008; Uchino, 2004) and psychological well-being (Helgeson, 2003; Kafetsios & Sideridis, 2006). Yet the current study found that, relative to young people without LAC status and living with family/partner, young people with LAC status and young people not living with family/partner reported significantly lower levels of perceived social support, particularly from family. Whilst intuitive, simply recommending an increase in social support may be insufficient in ensuring improved well-being and may even be considered risky. This point was evidenced by the findings of the current study that YPwO with violent offences reported significantly higher levels of perceived social support from friends than YPwO with non-violent offences. In this instance, to reduce the risk of offending behaviour, 'social support for conformity needs to exceed social support for crime' (Cullen, 1994, p.544). Clinically, to ensure optimum benefit, there is a need for more detailed and individualised assessment to consider the complex interactions of the mediating factors of social support benefits, such as an individual's level of skill (Sarason *et al.* 1990) and readiness for acceptance of enacted social support (Walsh *et al.* 2011) and the interpersonal, familial, cultural, and environmental influences of social

support (Martinez & Abrams, 2013). For example, developmental models recommend that intervention for young people at risk of offending and YPwO should include social-emotional skills training (Loeber *et al.* 2008), to enhance effective support-seeking and engagement in restorative justice and psychotherapy (Berastegui *et al.* 2012; King *et al.* 2014; Lane & Garfield, 2005).

Further considering contextual factors mediating the impact of social support, girls are reported to seek support in response to stress more than boys (Rose & Rudolph, 2006) and young people with adverse life experiences, who are in emotional turmoil, may be less capable of viewing other people as sources of available support (Thomas *et al.* 2007). Therefore, one might recommend that young people, especially males, need to be supported proactively to explore socially supportive relationships before a time of crisis, so that they can objectively reflect on support available and think about how they might seek this support in different circumstances, to ensure the opportunity for maximum benefit.

4.8.3 Sociocultural systemic intervention

Many of the above clinical and service recommendations are targeted to young people themselves, without a particular focus on the bidirectional perpetuating relationship between a young person's difficulties and their system. For example, particularly in community settings, YPwO indicate that their needs are being ignored and poorly met by professionals (Chitsabesan *et al.* 2006; Uservoice, 2011) and, as a result, tend to have a negative view of professionals, especially social workers and the police (Uservoice, 2011). Furthermore, unmet social support needs of YPwO have mostly been attributed to sociocultural, structural and psychological barriers to provision, including YPwO viewing professionals negatively, experiencing issues with stigma and confidentiality (King *et al.* 2014; Walsh *et al.* 2011). Therefore, intervention should focus on both the internal and external factors contributing to offending behaviour (Shelton, 2004) and in order to ensure that social support and interventions are accessible and useful for YPwO, policy, funding and professional training needs to enable services to deliver interventions in a way that is respectful, committed, flexible, effective, individualised and personally relevant (Mason & Prior, 2008; Lee & Lee, 2003; Naylor *et al*. 2008).

Tackling some of the aforementioned barriers, designed to develop and maintain the skills of frontline staff to engage with young people who present with complex needs, the mentalisation approach has recently been incorporated into an Adolescent Mentalization-Based Integrative Treatment (AMBIT; Bevington *et al.* 2012). Based on psychologically-informed consultation, training and multi-professional working, the AMBIT approach,

alongside strategic service restructure (merging of the YOT and youth services), has received positive feedback from a pilot study in Islington, although it has not yet been evaluated with young people themselves (Khan & Wilson, 2010).

Further broad-based intervention recommendations might also be made in relation to the lower levels of perceived social support reported amongst young people with LAC status and not living with family/partner in the current study. For example, chaotic frequent transitions and associated losses (Paton *et al.* 2009) are likely to affect a young person's sense of acceptance and every-day appraisal, memory of and attention to supportive actions from others (Lakey & Cohen, 2000), subsequently contributing to perceived availability, quality and outcomes of social support (Sarason *et al*. 1990). Therefore, to ensure the overall well-being of young people with LAC status (with and without offending histories), policy, funding and service structures need to be organised in a way that ensures smoother and less frequent transitions.

Critics note that intervention programs should not only include intervention to target early disruptive behaviour, impaired cognitive and social-emotional skills, lack of social support and poor parenting, but should also aim to rectify societal issues such as deprivation, poverty and unemployment, which ultimately predispose and perpetuate offending behaviour (Loeber *et al.* 2008; Pheonix, 2016). Intervention should be directed through a young person's entire ecosystem (Preston *et al.* 2015). Accordingly, the Well-being of Future Generation (Wales) Act (WG, 2015) describes a drive to improve social, economic, environmental and cultural well-being in Wales. Furthermore, specifically relating to the prevention of adverse childhood experiences, the Public Health Wales' Strategic Plan 2015-2018 (2015) has prioritised improving the health and well-being of children in their early years, through co-ordinated system-based working across public services, voluntary and private organisations at a national and local level. Public Health Wales (2015) recognises the Police as a fundamental part of this process and, accordingly, the South Wales Police and Crime Commissioner has signed a memorandum of understanding with Public Health Wales, to intervene earlier and more effectively (Bellis *et al.,* 2015).

4.9 Recommendations for future research

The current research opens up several avenues for future research. Considering that the current study is the first known to examine the relationship between emotion recognition and social support in YPwO and subgroups of YPwO, future research is needed to establish whether the current findings are replicated.

4.9.1 Future research relating to theoretical implications

The theoretical implications of the current study findings, open up a number of avenues for further exploration. For example, as noted, the current study findings of emotional skill deficits amongst young people with LAC status offers support for Attachment Theory and Mentalization Theory. In context of such theories, future research might include a specific attachment measure, to offer further insight into the relationship between attachment and emotion recognition.

The inclusion of an attachment measure might also expand on findings that young people with LAC status reported significantly lower levels of perceived social support, particularly from family. These findings were most clearly explained in context of the Integrated Model of Perceived Social Support (Sarason *et al.* 1990), future research including an attachment measure might more specifically explore the relationship between attachment styles and perceived social support.

The findings that 'violent' YPwO reported significantly higher levels of perceived social support from friends than 'non-violent' YPwO, suggests that , there is also need for research to include a more qualitative measure of the nature of socially supportive relationships, to establish whether certain types of social support are especially beneficial in certain situations (Sarason *et al.* 1990) and to examine the mediating factors that are related to perceived social support availability,quality and outcome (Mankowski & Wyer, 1997). Findings from such research might improve awareness of the impact of perceived support and help the design of particular types of supportive interventions for YPwO (and young people with LAC status).

Lastly, the findings that YPwO showed significantly lower ability to recognize fear through the VEPR task, offered some support for the IES and SOME theories. However, the majority of research has explored empathy and neurological amygdala dysfunctions with a focus on conduct disorder, rather than offending behaviour per se. Therefore, further research is required to assess empathic responsiveness and neurological deficits amongst offending samples specifically, to provide support for the applicability of the IES and SOME theories.

4.9.2 Future research building on current study limitations

All future research should build on the limitations of the current study, by, for example, examining alexithymia, recognition of others' emotions and perceived social support with a larger representative sample, including female and BAME YPwO. Furthermore, future

research might consider employing more context specific measures, such asvideo-clips including facial, gestural and prosodic emotional expressions, also employing and temporal constraints in the emotion recognition tasks to develop a more detailed ecological understanding of the cognitive processes underlying recognition of others' emotions in YPwO (Ihme *et al.* 2014a, 2014b; Jongen *et al.* 2014). Future research might also benefit from using clinical records of offence data, rather than relying on self-reports and using observational alexithymia measure alongside self-report measures to triangulate a more holistic formulation of difficulties.

Ideally, future research would be longitudinal in nature, to further explore the interplay of the specific risk factors experienced by YPwO and young people with ACE's, which contribute to emotional skills difficulties and reduced levels of perceived social support. For example, longitudinal research would contribute to our understanding of the processes by which social support exerts benefits (Johnson *et al.* 2011; Tanzer *et al.* 2013).

Finally, despite literature evidencing the benefits of certain interventions for YPwO, there is a lack of evidence about what intervention, provided by what profession, is effective for what type of offending behaviour (Lösel, 2001; Mason & Prior, 2008). Accordingly, future research might also continue to build on clinical research evidence thus far, to examine whether emotion recognition improvements through cognitive training, mentalisation-based training and psychotherapeutic approaches such as DDP, DBT and the TBM lead to enduring neurological, social and behavioural change for young people.

4.1 Conclusions

WG and the YJB emphasise the need to do more to understand the complex interplay of factors leading a young person to offend and re-offend (WG/YJB, 2014) and declare a commitment to "ensure work with young people is as effective as possible, and based on research evidence" (YJB, 2008, p.3). Emotional skills and social support are reported to be crucial to daily functioning and overall well-being and, therefore, the current study aimed to build on previous research to develop a better understanding of the impact of these psychosocial factors on offending behaviour, in the hope this might support the design of targeted interventions for YPwO (Syngelaki *et al.* 2013).

Accordingly, the current study furthered understanding that offending behaviour is likely to be the outcome of a complex interplay of individual, developmental, and social factors. Developmental theoretical frameworks posit that early adverse experiences predispose

emotional skills deficits, which reduce one's ability to use socially acceptable ways to express and regulate feelings, such as aggressive impulses, setting the stage for offending behaviour. Indeed, the current study evidenced that LAC status, representative of adverse childhood experiences, was more commonly reported amongst young people with, than young people without, an offending history. Specifically, LAC status, rather than offending status in isolation, was found to be significantly related to difficulties in identifying and describing feelings, ability to recognise others' emotions and levels of perceived social support, particularly from family.

Thus, the study indicates that cognitive, emotional and social functioning are likely to mediate the link between early adverse experiences and behaviour problems (van Goozen *et al*. 2007). Accordingly, young people services and professionals need to "work together to change perceptions of young people who offend… to better understand the needs of these…vulnerable young people and how their self-belief, skills and achievements can be encouraged to give them better chances in life" (WG/YJB 2014, p.2).

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APPENDIX A: Search terms and databases used in the literature review

LITERATURE SOURCES		
Databases	**Key Journals in the Field**	**Grey Literature**
• Web of Science • PsycINFO (incl. Embase • Ovid MEDLINE) • PsycARTICLES • ProQuest Dissertations & Theses- • AMED	Youth Justice; British Journal of Criminology; Journal of Forensic Psychiatry and Psychology; Journal of Criminal Justice Criminal behaviour and mental health	Ministry of Justice Prison Reform Trust Gov.uk Crown Prosecution Service Youth Justice Board Beyond Youth Custody

SEARCH TEMRS		
1. **Emotion recognition**	**2. Social support**	**3. YPwO**
• Emotion* literacy OR Alexithym* OR emotion* intelligence OR emotion* recogn* OR emotion* function OR prosody OR fac* emotion* recogn* OR emotion* vocal recogn* OR emotion* verbal recogn* OR facial affect OR verbal affect OR verbal and non-verbal emotion* recognition OR emotion* self OR emotion* other* or misrecog* OR affect recogn* OR	Support* OR perce* support* OR social support* OR support needs OR support* relation*	Juvenile delinquen* OR delinq* OR you* offen* OR anti-social behav* OR externali* behav* OR criminal behav* OR youth justice OR Adolescent conduct disorder

APPENDIX B: STROBE checklist for cross- sectional studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Table displaying Strobe scoring for studies reviewed in Systematic Review

	Intro		Methods											Results						Discussion				Funding	Quality Score (%)
	Title & Abstract	Background & rationale	Aims and hypotheses	Study design	Setting, locations, dates	Inc./excl. criteria, sources and methods of p selection	Defines outcome variables, predictors, confounding variables and effect modification	Sources of data and measures. Describes comparability of Ax.	Describes efforts to address bias	Explains study size	Explains how variables were handled and which groupings and why	Describes statistical methods and control for confounders	Explains methods for examining subgroups and interactions	Explains address of missing data	Describes statistical methods taking account of sampling strat.	Participants: numbers eligible, examined eligibility	**Descriptive stats**: demographic and potential confounders	Missing data for each variable	Reports numbers of outcome events for each group	Gives adjusted estimates, if applicable, confounder adjusted estimates, makes clear which confounders are adjusted for	Other analysis: subgroups and interactions	Summarises key results with reference to objectives	Discusses imitations, bias and imprecision.	Gives cautious interpretation of results, considering objectives, limitations, multiplicity of analyses, results from other	Generalisability		
Moriarty *et al.*, (2001)	✓	✓	✓	×	½	½	½	✓	×	×	✓	½	n/a	✓	×	×	×	×	✓	×	n/a	½	✓	✓	✓	×	41.7
Zimmermann *et al.*, (2006)	✓	✓	✓	×	½	½	✓	✓	×	✓	✓	✓	n/a	×	×	×	✓	×	✓	✓	n/a	✓	✓	✓	✓	×	62.5
Möller *et al.*, (2014)	✓	✓	✓	✓	½	¾	½	✓	✓	×	✓	½	✓	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓	×	×	50.0
Savitsky & Czyzewski (1978)	✓	✓	✓	×	½	½	✓	✓	×	×	✓	✓	n/a	×	×	×	½	×	✓	✓	n/a	½	½	✓	✓	✓	50.0
McCown *et al.*, (1986).	✓	✓	✓	×	½	½	½	✓	½	×	✓	½	n/a	×	×	×	½	×	✓	×	n/a	½	×	½	×	×	25.0
McCown *et al.*, (1988)	✓	✓	✓	×	½	½	½	✓	✓	×	✓	½	n/a	×	×	×	×	×	✓	½	n/a	½	½	✓	×	×	33.3
Carr & Lutjemeier (2005)	✓	✓	✓	✓	½	½	✓	✓	✓	×	✓	✓	✓	×	×	✓	✓	×	✓	✓	n/a	½	✓	×	×	×	60.0
Jones *et al.*, (2007)	✓	✓	✓	×	½	½	✓	½	×	×	✓	✓	n/a	×	×	×	✓	×	✓	✓	n/a	½	✓	✓	✓	×	50.0
Sato *et al.*, (2009)	✓	✓	✓	×	½	½	✓	✓	✓	×	✓	✓	✓	×	×	×	✓	×	✓	✓	✓	½	✓	✓	×	✓	61.5
Bowen *et al.*, (2013)	✓	✓	✓	×	½	½	✓	✓	×	×	✓	✓	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	69.2
Gonzalez-Gadea *et al.*, (2014)	✓	✓	✓	×	½	✓	✓	✓	½	×	✓	✓	n/a	×	×	×	✓	×	✓	✓	n/a	✓	✓	✓	×	✓	62.5

APPENDIX C: Participant Information Sheet

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

SOUTH WALES DOCTORAL PROGRAMME IN CLINICAL PSYCHOLOGY
CWRS DOCTORIAETH DE CYMRU MEWN SEICOLEG CLINIGOL

School of Psychology

PARTICIPANT INFORMATION SHEET

Title of the study	Emotion recognition and perceived social support in young people who offend
Main researcher:	Marielle (Maz) Wilcox (Trainee Clinical Psychologist, Postgraduate Student)
Supervisors:	- Dr. Liz Andrew (Consultant Clinical Psychologist) - Professor Neil Frude (Research Director, South Wales Doctoral Programme in Clinical Psychology & Consultant Clinical Psychologist)
Contact information:	Address: South Wales Doctoral Programme in Clinical Psychology, 11th Floor, School of Psychology, Cardiff University, Tower Building, 70 Park Place, Cardiff, CF10 3AT Phone: 02920 870582 Email: wilcoxmr1@cardiff.ac.uk

We would like you to take part in our research study. Before you decide if you want to take part, please read this information sheet to understand why we are doing the study and what you will be asked to do. If you are under 16, you also need to talk to your parents or carers, because they also have to sign a consent form to say they agree for you to take part. Please ask questions about anything that doesn't make sense.

What is the purpose of the study?

- This study will check whether being able to recognise emotions and having support from friends and family makes it more or less likely for young people to commit offences. Knowing this will make services better for young people who have committed offences.

Why have I been invited?

- You have been invited to take part, because you are 14-18 years old.
- This study will have two groups of 50 young people. If you have ever committed an offence, you will be in group 1. If you have never committed an offence, you will be in group 2.

Do I have to take part?

- It is up to you if you decide to take part; you do not have to take part if you do not want to. If you want to take part, we will ask you (and your parent/ guardian if you are under 16) to sign a consent form to say that you have read and understood this information sheet and that you agree to take part.
- If you choose not to take part or want to stop at any time, that's absolutely fine. You won't need to give a reason and it will not affect any of the services that you receive.

What will I be asked to do?

We will ask you to do a questionnaire and two tasks on a laptop.

- The questionnaire will ask questions about you, like age, your feelings and what support you get from others. If you are in the young offender group, the questionnaire will also ask what type of offence(s) you have committed (for example, burglary). We will not ask any more questions about your offences.
- The tasks will ask you to choose what emotion someone is showing by looking at pictures of faces and listening to clips of voices.
- The researcher can stay with you and help you with the questionnaire and computer tasks, if you prefer. It will take less than 30 minutes and you do not need to answer a question if you do not want to.

Are there advantages and disadvantages of taking part?

- We hope the research will give us more information about how to make young offending services better.
- Taking part in the study should not cause you any worries. But, we will have some 'debrief' time for you to talk about anything if you do feel unhappy and we will also give you some phone numbers that you can ring for support.

Will I get paid?

- We can pay you for money spent on travelling to take part in the study. You will also be entered into a prize draw where you will have a 20% chance of winning a £10 Asda voucher.

Will my information be kept confidential?

- Yes. We will make sure that any information you give us is kept confidential. Your consent form and personal information will be kept in a locked cabinet in an NHS building.
- The only time we will share information with other professionals is if you tell us anything that makes us really worried about you, or somebody else's safety. For example, if you told us that you were planning on harming yourself or another person.

What will happen to the results of the research study?

- The findings will help to make services for young people better.
- The findings will also be written up into a report as part of Marielle's training to be a clinical psychologist. The findings might also be published in academic journals or presented at meetings.
- If you would like to know more about the findings of the research you can ask for a summary of the findings.

What if there is a problem?

- If you have a worry about any bit of the study, you can speak to the researchers, your key worker or tutor. We will do our best to answer your questions. If you are still unhappy after speaking to the researchers and want to make a complaint, you can do this by contacting the Cardiff University School of Psychology Ethics Committee: School of Psychology, Cardiff University, Tower Building, 70 Park Place, Cardiff, CF10 3AT
  Tel: 02920 870 360
  Email: psychethics@cardiff.ac.uk
  Web: http://psych.cg.ac.uk/aboutus/ethics.html

Who has given this study the go-ahead?

- The study has been reviewed and approved by the Cardiff School of Psychology Ethics committee

Further information and contact details

If you would like more information about the study please contact Marielle Wilcox (researcher) via **wilcoxmr1@cardiff.ac.uk** or Professor Neil Frude (supervisor) via email neil.frude@wales.nhs.uk

APPENDIX D: Consent Forms

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

SOUTH WALES DOCTORAL PROGRAMME IN CLINICAL PSYCHOLOGY
CWRS DOCTORIAETH DE CYMRU MEWN SEICOLEG CLINIGOL

School of Psychology

PARTICIPANT DETAILS AND CONSENT FORM PARTICIPANTS AGED 14 & 15

Emotion recognition and perceived social support in young offenders

Researcher: Marielle Wilcox, Trainee Clinical Psychology, Postgraduate Student

PARTICIPANT DETAILS

Please complete this form, in case there is an emergency and/or in case we need to contact you if you have won a £10 voucher.

Name	
Address	
Post Code	
Phone number	
GP details	GP Surgery name and location: GP name: GP phone number:
Key Worker/ Case Worker	Name: Team name/location:
Social Worker	Name: Team name/location:

CONSENT (OUR AGREEMENT TO TAKE PART)

	Please initial boxes: Parent/guardian	participant
We have read and understand the participant information sheet. We have been given a copy to keep and have had the chance to ask questions.	☐	☐
We understand that taking part in this study is voluntary and it is okay to withdraw at any time without giving a reason.	☐	☐
We understand that all information will stay confidential. As set out in the Data Protection Act, the information may be kept forever.	☐	☐
We know how to contact the researcher if we need to	☐	☐
I agree to take part in this research	☐	☐
The research team would like to interview a small number of people to ask them if they think recognising emotions and having support makes committing offences more or less likely. If you would like to be interviewed, please tick this box. We will select a small number of people at random for interview.	☐	

_____ Participant Name	_____ Participant signature	_____ Date
_____ Parent/ guardian name	_____ Parent/ guardian signature	_____ Date
_____ Researcher name	_____ Researcher signature	_____ Date

The researcher will complete this section

Young offender group ☐

Control group ☐

Allocated participant ID ☐

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

SOUTH WALES DOCTORAL PROGRAMME IN CLINICAL PSYCHOLOGY
CWRS DOCTORIAETH DE CYMRU MEWN SEICOLEG CLINIGOL

School of Psychology

PARTICIPANT DETAILS AND CONSENT FORM PARTICIPANTS AGED 16+

Emotion recognition and perceived social support in young offenders

Researcher: Marielle Wilcox, Trainee Clinical Psychology, Postgraduate Student

PARTICIPANT DETAILS

Please complete this form, in case there is an emergency and/or in case we need to contact you if you have won a £10 voucher.

Name	
Address	
Post Code	
Phone number	
GP details	GP Surgery name and location: GP name: GP phone number:
Key Worker/ Case Worker	Name: Team name/location:
Social Worker	Name: Team name/location:

CONSENT (YOUR AGREEMENT TO TAKE PART)

Please initial boxes

I have read and understand the participant information sheet. I have been given a copy to keep and have had the opportunity to ask questions. ☐

I understand that taking part in this study is voluntary and that I can withdraw at any time without giving a reason. ☐

I understand that the information I provide will remain confidential. As set out in the Data Protection Act, the information may be kept forever. ☐

I know how to contact the researcher if I need to. ☐

I agree to take part in this research. ☐

We want to conduct interviews with a small number of people to ask what they think about the relationships between emotional skills, support and offending. If you would like to be interviewed, please tick this box. We will select a small number of people at random for interview. ☐

_____	_____	_____
Participant Name	Participant signature	Date
_____	_____	_____
Researcher name:	Researcher signature:	Date

The researcher will complete this section

Young offender group ☐

Control group ☐

Allocated participant ID ☐

APPENDIX E: Debrief Form

South Wales Doctoral Programme In Clinical Psychology
Cwrs Doctoriaeth De Cymru mewn Seicoleg Clinigol

School of Psychology

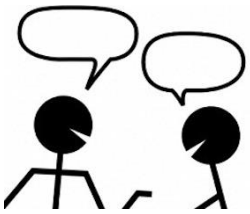
DEBRIEF FORM

Participant ID

Thank you!
Thank you for taking part and helping us to better understand the link between recognising emotions, getting support and committing offences. This information will make young offending services better.

Your information
All information you have given will be kept confidential. You are free to withdraw from the study at any time without giving a reason.
Remember, if you told us something that made us very worried about you or someone else's safety, we will share these concerns with other professionals.

Worries
If you have a worry about any bit of the study, you can speak to the researchers or your key worker or tutor. We will do our best to answer your questions. If you are still unhappy after speaking to the researchers and want to make a complaint, you can do this by contacting the Cardiff University School of Psychology Ethics Committee: School of Psychology, Cardiff University, Tower Building, 70 Park Place, Cardiff, CF10 3AT
Tel: 02920 870 360
Email: psychethics@cardiff.ac.uk
Web: http://psych.cg.ac.uk/aboutus/ethics.html



Support
We have attached the contact details of people and organisations if you would like further help or support.

Thank you again for taking part. Please let the researcher know if you would like a summary of the findings of the study.

Researcher: Marielle Wilcox
Email: wilcoxmr1@cardiff.ac.uk
Phone: 02920 870582

Supervisor: Dr. Liz Andrew
Email: liz.andrew@wales.nhs.uk

Supervisor: Prof. Neil Frude
Email: neil.frude@wales.nhs.uk
Phone: 02920 870582

CONTACTS FOR FURTHER SUPPORT

The researchers do not accept responsibility for the contents of advice obtained via the contacts below.

CHILDLINE
Freephone: 0800 1111 (24 hours)
www.childline.org.uk
Childline is the UK's free helpline for children and young people. It provides confidential telephone counselling service for any child with a problem. It comforts, advises and protects.

NSPCC
This organisation aims to give children the help, support and environment they need to stay safe from cruelty.
National helpline 0808 800 5000.
Wales 029 20 267 000.

NHS Direct
NHS Direct delivers telephone and internet information and advice about health, illness and health services day and night direct to the public, enabling patients to make decisions about their healthcare and that of their families.
0845 46 47

GP
GPs look after the health of people in their local community and deal with a whole range of health problems. You can contact your local GP surgery.

APPENDIX F: Copy of Ethical Approval from Cardiff University School of Psychology Research Committee

From: **psychethics** (psychethics@cardiff.ac.uk) You moved this message to its current location.
Sent: 18 June 2015 10:54:04
To: Maria Wilcox (WilcoxMR1@cardiff.ac.uk)
Cc: neil.frude@wales.nhs.uk (neil.frude@wales.nhs.uk)

Dear Marielle,

The Chair of the Ethics Committee has considered your revised postgraduate project proposal: Emotion recognition and perceived social support in young offenders (EC.15.05.12.4137R2).

The project has now been approved.

Please note that if any changes are made to the above project then you must notify the Ethics Committee.

Best wishes,

Natalie

School of Psychology Research Ethics Committee

Cardiff University Tower Building 70 Park Place Cardiff CF10 3AT	Prifysgol Caerdydd Adeilad y Tŵr 70 Plas y Parc Caerdydd CF10 3AT
Tel: +44(0)29 208 70360 Email: psychethics@cardiff.ac.uk	Ffôn: +44(0)29 208 70360 E-bost: psychethics@caerdydd.ac.uk

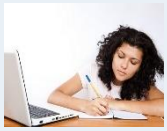
http://psych.cf.ac.uk/aboutus/ethics.html

Appendix G: Demographics questionnaire, Toronto Alexithymia Scale, Multidimensional Scale of Perceived Social Support

SOUTH WALES DOCTORAL PROGRAMME IN CLINICAL PSYCHOLOGY
CWRS DOCTORIAETH DE CYMRU MEWN SEICOLEG CLINIGOL

This questionnaire is for research proposal, ethics and appendices purposes to display the content of the questions (and pictures) administered via computer.

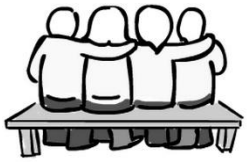
Date: ……

ABOUT YOU	
How old are you?	
 **What is your gender?**	☐ male ☐ female ☐ prefer not to say
 **What is your ethnicity?**	☐ White ☐ Mixed ethnic groups ☐ Asian/Asian British ☐ Black/African/Caribbean/Black British ☐ Other ethnic group: _____
 **Who do you live with?**	☐ Living alone ☐ Living with partner/spouse ☐ Living with family ☐ No fixed accommodation ☐ Other → Please specify:_____
 **What grades or marks do or did you usually get on your work?**	☐ Mostly A*'s 90-100% ☐ Mostly A's 80-90% ☐ Mostly B's 70-80% ☐ Mostly C's 60-70% ☐ Mostly D's 50- 60% ☐ Mostly E's 40- 50% ☐ Mostly fails
 **What qualifications do you have?** Just tick the option that most closely matches what qualifications you've got.	☐ I'm in year 9-11, so haven't got any qualifications yet ☐ 1-4 GCSE's (any grade) OR Foundation Diploma OR GNVQ OR NVQ level 1 ☐ 5+ GCSE's (A*-C) OR 1 A level or 2-3 As levels OR VCE's OR NVQ level 2 OR Intermediate GNVQ OR BTEC General Diploma ☐ 2+ A levels OR 4=As levels OR NVQ level 3 OR Advanced GNVQ OR City and Guilds Advanced Craft OR ONC/OND OR BTEC National ☐ No qualifications
 **Do you work and/or study?**	☐ Work (paid or unpaid) ☐ Government sponsored training scheme ☐ Study ☐ Working AND studying ☐ Not working or studying
 **Professional input:** Have you ever spoken to anyone professionally or attended counselling/ therapy to talk about your thoughts and feelings?	☐ Yes → please specify:_____ ☐ No ☐ Prefer not to say
HAVE YOU EVER SPENT TIME IN CARE?	☐ Yes ☐ No ☐ Prefer not to say

TORONTO ALEXITHYMIA SCALE

These questions are about your feelings. Just tick to what extent you agree or disagree with each statement.

		Strongly disagree	Disagree	Neither disagree or Agree	Agree	Strongly Agree
1.	I am often confused about what emotion I am feeling.					
2.	It is difficult for me to find the right words for my feelings.					
3.	I have physical sensations that even doctors don't understand.					
4.	I am able to describe my feelings easily					
5.	I prefer to analyze problems rather than just describe them.					
6.	When I am upset, I don't know if I am sad, frightened, or angry					
7.	I find it hard to describe how I feel about people.					
8.	I prefer to just let things happen rather than to understand why they turned out that way.					
9.	I have feelings that I can't quite identify.					
10.	Being in touch with emotions is essential.					
11.	I am often puzzled by sensations in my body.					
12.	People tell me to describe my feelings more.					
13.	I don't know what's going on inside me.					
14.	I often don't know why I am angry.					
15.	I prefer talking to people about their daily activities rather than their feelings.					
16.	I prefer to watch "light" entertainment shows rather than psychological dramas.					
17.	It is difficult for me to reveal my innermost feelings, even to close friends.					
18.	I can feel close to someone, even in moments of silence.					
19.	I find examination of my feelings useful in solving personal problems					
20.	Looking for hidden meanings in movies or plays distracts from their enjoyment.					



MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

These questions are about your level of support. Tick to what extent you agree or disagree with each statement.	Very strongly disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Very strongly agree
1. There is a special person who is around when I am in need.							
2. There is a special person with whom I can share my joys and sorrows.							
3. My family really tries to help me.							
4. I get the emotional help and support I need from my family.							
5. I have a special person who is a real source of comfort to me.							
6. My friends really try to help me.							
7. I can count on my friends when things go wrong.							
8. I can talk about my problems with my family.							
9 I have friends with whom I can share my joys and sorrows.							
10. There is a special person in my life who cares about my feelings.							
11. My family is willing to help me make decisions.							
12. I can talk about my problems with my friends.							

Offences you have committed (for YPwO only)

Please tick which of the following offences you have committed.

Violence against person offences

- ☐ Assault
- ☐ Threatening behaviour
- ☐ Possession of offensive weapon
- ☐ Possession of firearm with intent to cause harm
- ☐ Grievous bodily harm
- ☐ Abduction/ kidnapping
- ☐ Manslaughter, Murder or attempted murder

Robbery, burglary and arson

- ☐ Robbery/ Burglary
- ☐ Robbery/ burglary causing injury
- ☐ Handling stolen goods
- ☐ Theft
- ☐ Arson endangering life

Public order offences

- ☐ Breach of the Peace
- ☐ Drunk and disorderly
- ☐ Rioting
- ☐ Violent disorder
- ☐ Bomb hoax
- ☐ Public nuisance

Drug offences

- ☐ Possession of class A drug
- ☐ Possession of class B/C drug
- ☐ Supply of class A drug
- ☐ Supply of class B/C drug
- ☐ Import/export of controlled drug

Other

- ☐ Absconding from custody
- ☐ Blackmail
- ☐ Cruelty to animals
- ☐ Obstructing emergency services
- ☐ Resisting arrest
- ☐ Fraud
- ☐ Other (specify): _____

Sexual offences

- ☐ Unlawful intercourse with person under 16
- ☐ Unlawful intercourse with person under 13
- ☐ Indecent behaviour
- ☐ Indecent assault
- ☐ Rape

Motoring/ vehicle offences

- ☐ Driving under influence of drugs/alcohol
- ☐ Theft of a vehicle
- ☐ Theft of a vehicle causing injury
- ☐ Injury by dangerous driving
- ☐ Dangerous driving
- ☐ Driving whilst disqualified
- ☐ Death by dangerous driving
- ☐ Other motoring offence

- ☐ **Prefer not to say**

APPENDIX H: T-tests with and without outliers

	Outliers included p value	Outliers removed p value	Difference to statistical significance
TAS-total	.15	.15	No difference
TAS-DIF	.006**	.0001***	More significant with outliers removed
TAS-DDF	.04*	.04*	No difference
TAS-EOT	.04*	.04*	No difference
MSPSS total	.12	.03*	Significant with outliers removed
MSPSS Family	.09	.03*	Significant with outliers removed
MSPSS Friends	.08	.09	No difference
MSPSS Sig Other	.82	.52	No difference
VPER Task total	.012*	.004**	More significant with outliers removed
VEPR happiness	.14	.14	No difference
VEPR sadness	.09	.01*	Significant with outliers removed
VEPR fear	.003**	.02*	Less significant with outliers removed
VEPR anger	.55	.55	No difference
VEPR neutral	.05	.02*	Significant with outliers removed
FER Task total	.01*	.02*	No difference
FER happiness total	.66	.57	No difference
FER sadness total	.16	.16	No difference
FER fear total	.12	.19	No difference
FER anger total	.14	.19	No difference
FER neutral	.0001***	.0001***	No difference

TAS**= Toronto Alexithymia Scale; **MSPSS**= Multidimensional Scale of Perceived Social Support; **VEPR**= Verbal Emotion Prosody Recognition; **FER**= Facial Emotion Recognition.* *$p<.05$, ** $p<.001$, $p<.0001$

APPENDIX I: Skewness and Kurtosis of continuous variables

	YPwO			**Control**			**Whole sample**	
	Skew	Kurtosis	*p* value	Skew	Kurtosis	*p* value	Skew	Kurtosis
Age	-1.49	-1.1	.00	-1.1	.21	.00	-1.8	-.89
TAS-20 total	-.61	0.43	.93	.37	.35	.48	.11	.91
TAS-DIF	.79	-.96	.28	1.59	.34	.12	2.08	-.51
TAS-DDF	-0.87	-.39	.37	1.26	-.1.17	.01	.41	-.89
TAS-EOT	-2.82	2.05	.008	-2.37	-.79	.01	-4.69	4.33
MSPSS total	.69	-.75	.39	-3.61	6.29	.002	-1.99	-1.15
MSPSS Family	-2.16	.81	.007	3.48	3.73	.001	-3.95	2.42
MSPSS Friends	-1.76	.77	.06	-2.77	3.03	.013	-3.18	2.01
MSPSS Sig Other	-.18	-1.54	.02	-2.63	3.97	.005	-1.8	0.99
VEPR Task total	-.91	-1.48	.042	-2.65	.52	.00	-2.25	-1.25
VEPR happy	-2.65	.23	.00	-2.84	.62	.00	-3.89	.64
VEPR sad	-3.55	1.39	.00	-6.27	8.04	.00	-6.44	4.62
VEPR fear	-.62	-0.32	.00	-1.73	-.71	.00	-1.26	-1.19
VEPR anger	-3.15	1.05	.004	-1.72	-1.92	.00	-3.38	-.47
VEPR neutral	-2.66	.77		-4.73	3.69		-4.81	2.00
FER Task total	-1.90	-.93	.14	-1.04	-.25	.27	-3.31	2.38
FER happy total	-1.41	.79	.004	-.37	-.89	.001	-1.61	0.72
FER happy 25%	2.41	-.65		1.03	1.14		2.58	-1.13
FER happy 50%	1.64	-.97		-1.02	-1.08		-1.82	-1.52
FER happy 75%	-7.26	8.66		-11.34	19.8		-12.59	19.35
FER happy 100%	-9.47	12.89		-20.98	75.53		-17.39	33.26
FER sad total	-.95	-1.18	.02	.30	-.73	.03	-1.00	-.97
FER sad 25%	1.57	-.87		2.41	-.65		2.81	-1.07
FER sad 50%	.00	-2.03		-2.19	-1.41		-1.39	-2.81
FER sad 75%	-2.69	-.20		-3.27	.23		-4.12	-0.09
FER sad 100%	-4.94	2.99		-4.14	-.09		-6.81	3.83
FER fear total	-2.16	-.01	.003	-1.92	-.47	.003	-3.28	-.39
FER fear 25%	1.78	-1.39		.84	-1.84		1.78	-2.34
FER fear 50%	-3.74	.94		-6.31	5.87		-6.65	3.41
FER fear 75%	-3.86	1.22		-5.42	3.64		-6.39	3.00
FER fear 100%	-7.49	8.84		-8.16	8.75		-11.76	16.44
FER anger total	-1.39	1.21	.00	-.84	.34	.00	-1.58	1.04
FER anger 25%	2.79	-.22		1.29	-1.00		2.73	-1.18
FER anger 50%	-.58	-.84		-1.18	-1.11		-1.19	-1.47
FER anger 75%	-7.49	8.84		-3.73	-.67		-8.21	6.76
FER anger 100%	-6.56	6.04		-11.34	19.82		-11.79	16.58
FER neutral	-.82	-.86		-5.43	4.01		-3.55	-.49

APPENDIX J: Bivariate correlations between the main study variables for YPwO group and control group

Table 1: Bivariate correlations between the main study variables for the young people who offend group.

		Age	TAS				MSPSS				VEPR						FER					
			TAS-20	DIF	DDF	EOT	Total	Family	Friends	Sig O	Total	Happy	Sad	Fear	Anger	Neutral	Total	Happy	Sad	Fear	Anger	Neutral
TAS	**Total**		-																			
	DIF			-																		
	DDF				-																	
	EOT					-																
MSPSS	**Total**		-.15[1]	-.32*			-															
	Family		-.13[1]	-.35*				-														
	Friends		-.12[1]	-.25					-													
	Sig. O									-												
VEPR	**Total**		.26*[1]				.20[1]	.24			-											
	Happy			-.02				.19				-										
	Sad					-.27	.19	.23		.26			-									
	Fear						.23		.16	.23				-								
	Anger														-							
	Neutral															-						
FER	**Total**		.33*[1]			.27	.23[1]	.19		.24	.75***[1]	.44**	.63***	.43**	.51***	.58***	-					
	Happy							.17			.36*	.43**			.34*			-				
	Sad										.55***	.25	.59***		.37**	.47***			-			
	Fear										.56***	.29*	.44**	.45**	.29*	.45***				-		
	Anger										.47**	.28	.35*	.20	.27	.42**					-	
	Neutral						.13			.35*	.35*		.37**	.15		.35*						-

***TAS**= Toronto Alexithymia Scale; **MSPSS**= Multidimensional Scale of Perceived Social Support; **VEPR**= Verbal Emotion Prosody Recognition; **FER**= Facial Emotion Recognition. Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The null hypothesis was rejected if the BCa confidence intervals did not cross zero. (*bootstrapped p<.05, **bootstrapped p<.01, ***p<.001); [1]one-tailed analysis and p value*

Table 2: Bivariate correlations between the main study variables for the control group.

		Age	TAS				MSPSS				VEPR						FER					
			TAS-20	DIF	DDF	EOT	Total	Family	Friends	Sig O	Total	Happy	Sad	Fear	Anger	Neutral	Total	Happy	Sad	Fear	Anger	Neutral
TAS	**Total**		-																			
	DIF			-																		
	DDF				-																	
	EOT					-																
MSPSS	**Total**		-.20[1]	-.29**			-															
	Family		-.24[1]	-.35***				-														
	Friends		-.29*[1]	-.35***					-													
	Sig. O									-												
VEPR	**Total**		-.29*[1]				.19[1]	.18			-											
	Happy			-.30*				.06				-										
	Sad					.13		.20		.19			-									
	Fear								.19	.22				-								
	Anger														-							
	Neutral															-						
FER	**Total**		-.09[1]			-.08	.19[1]	.20		.22	.49***[1]	.23	.44**	.24	.36*	.42**	-					
	Happy							.24			.17	.12			.19			-				
	Sad										.24	-.12	.31*		.13	.29*			-			
	Fear										.33*	.11	.32*	.20	.34*	.16				-		
	Anger										.35*	.20	.19	.16	.17	.44***					-	
	Neutral						.32*			.25	.31*		.07	.09		.07						-

***TAS**= Toronto Alexithymia Scale; **MSPSS**= Multidimensional Scale of Perceived Social Support; **VEPR**= Verbal Emotion Prosody Recognition; **FER**= Facial Emotion Recognition. Bias corrected and accelerated (BCa) confidence intervals were computed based on 2,000 bootstrap samples but are not reported, due to limited space. The null hypothesis was rejected if the BCa confidence intervals did not cross zero. (*bootstrapped p<.05, **bootstrapped p<.01, ***p<.001); [1]one-tailed analysis and p value*

APPENDIX K: Bootstrapped ANOVA, MANOVA and Repeated Measures MANOVA for FER**: d**ifference in p values

HAPPINESS	Bootstrapped ANOVA	MANOVA	RM MANOVA
Main effect of intensity	-	-	F(2.29, 225.13)= 179.68, p<.01
FER happiness total (main group difference)	F (1,98) =.19, p=. 66	F (1,98)=.19, p= .66	F(1,98)= .19, p=.66
FER happiness 25% **FER happiness 50%** **FER happiness 75%** **FER happiness 100%**	F (1,98)= .03, p=.87 F (1,98)= .57, p=.45 F 1,98)= 2.89, p=.11 F (1,98)= 1.89, p=.19	F (1,98)= .03, p=.87 F (1,98)= .57, p=.45 F 1,98)= 2.89, p=.09 F (1,98)= 1.89, p=.17	Interaction between intensity & group: F(2.29,225.13)= .95, p=.39

SADNESS	Bootstrapped ANOVA	MANOVA	RM MANOVA
Main effect of intensity	-	-	F(2.72, 266.74)= 75.33, p<.01
FER sadness total (main group difference)	F (1,98)= 1.98, p=.18	F(1,98)=1.98, p=.16	F(1,98)=1.98, p=.16
FER sadness 25% **FER sadness 50%** **FER sadness 75%** **FER sadness 100%**	F (1,98)= .02 p=.89 F (1,97)= 2.45, p=.14[1] F 1,98)= .03, p=.87 F (1,98)= .68, p=.42	F 1,98)= .02, p=.88 F (1,98)= 5.34, p<.05*[2] F 1,98)= .03, p=.87 F (1,98)= .68, p= .41	Interaction between intensity & group: F(2.72, 266.74)=2.12, p=.10

[1]controlling for LAC status; [2] not controlling for LAC status; *p<.05

FEAR	Bootstrapped ANOVA	MANOVA	RM MANOVA
Main effect of intensity	-	-	F(2.48, 242.58)= 56.53, p<.001
FER Fear total (main group difference)	F (1,98)= 2.45, p=.12	F (1,98)= 2.45, p=.12	F (1,98)= 2.45, p=.12
FER fear 25% **FER fear 50%** **FER fear 75%** **FER fear 100%**	F (1,98)= 1.13, p=.28 F (1,96)= .04, p=.82[1] F (1,98)=.28, p=.60 F (1,98)= 1.49, p=.23	F (1,98)= 1.13, p=.29 F (1,98)= 2.02, p=.16[2] F (1,98)=.28, p=.60 F (1,98)= 1.49, p=.23	Interaction between intensity & group: F(2.48, 242.58)=.23, p=.84

[1]controlling for accommodation; [2]not controlling for accommodation

ANGER	Bootstrapped ANOVA	MANOVA	RM MANOVA
Main effect of intensity	-	-	F (2.51, 245.46)= 125.51, p<.001
FER anger total (main group difference)	F (1,98)= 2.21, p=.15	F (1,98)= 2.21, p=.14	F (1,98)= 2.21, p=.14
FER anger 25% **FER anger 50%** **FER anger 75%** **FER anger 100%**	F (1,98)= 1.92, p=.17 F (1,98)= .37, p=.55 F (1,98)=.19, p=.65 F (1,96)= .35, p=.56[1]	F (1,98)= 1.92, p=.17 F (1,98)= 37, p=.54 F (1,98)=.19, p= .67 F (1,98)= 3.75 , p= .06[2]	Interaction between intensity and group: F (2.51, 245.46)=.83, p=.46

[1]controlling for accommodation; [2]not controlling for accommodation

APPENDIX L: Violent and non-violent offences committed by current sample of YPwO

Violent offences	Non-violent offences
Assault	Possession of drugs
Theft of a vehicle causing harm	Theft of a vehicle
Injury by dangerous driving	Supply of drugs
Possession of an offensive weapon/ firearm	Theft
Grievous bodily harm	Handling stolen goods
Rape	Breach of the peace
Robbery	Fraud
Arson	Drunk and disorderly
Criminal damage	Obstructing Emergency Services
Resisting arrest	
Threatening behaviour	

Violence is defined by the World Health Organization (WHO, 2014) as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation" (p.4).

Appendix M: Youth Justice Board Counting Rules

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
01	VIOLENCE AGAINST THE PERSON		
0101	**Abduction/Kidnapping**	7	
	Abduction of female by force		Serious
	Child abduction		
	False imprisonment		Serious
	Hijacking		Serious
	Kidnapping		Serious
0102	**Assault police officer (common assault)***	3	
	Assault with intent to resist arrest or assaulting a person assisting a police constable		
0103	**Common assault***	3	
	Assault & battery		
	Assault by beating		
0104	**Grievous Bodily Harm (wound or inflict)***	6	
0105	**Manslaughter***	8	Serious
	Child destruction, infanticide or manslaughter due to diminished responsibility		
0106	**Murder***	8	Serious
	Attempted murder		
0107	**Indictable firearms offences**	5	
	Possessing a real or imitation firearm at the time of committing or being arrested for an offence specified in Schedule 1 of the Firearms Act 1968		
	Possession of real or imitation firearms/explosives with intent to commit an indictable offence – including resisting arrest		Serious
	Possession of real or imitation firearms/explosives with intent to cause violence		
0108	**Other wounding***	4	
	Administering poison with intent to injure or annoy		
	Assault occasioning actual bodily harm (ABH)		
0109	**Possession of an offensive weapon**	3	
	Having an article with a blade or point in a public place		
0110	**Threatening, abusive or insulting words or behaviour**	3	
0111	**Threat or conspiracy to Murder**	5	Serious
	Soliciting to commit murder		
0112	**Wounding or other act endangering life***	7	
	Attempting to choke, suffocate with intent to commit an indictable offence (garrotting)		Serious
	Burning or maiming by explosion		
	Creating danger by causing anything to be on the road, or interfering with a vehicle or traffic equipment		
	Causing explosions or casting corrosive fluids with intent to do grievous bodily harm		Serious
	Endangering life or causing harm by administering poison		
	Endangering railway passengers (by placing anything on railway, taking up rails, changing points and signals or by throwing anything at railway carriages)		Serious
	Causing danger to road users (throwing stones etc.)		
	Possession of firearms with intent to endanger life or injure property		Serious
	Using chloroform to commit or assist in committing an indictable offence		Serious
	Using firearms or imitation firearms with intent to resist arrest		Serious
0113	**Wounding with intent to cause grievous bodily harm (section 18)***	7	Serious

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
0114	Other/unspecified violence against the person	4	
02	SEXUAL OFFENCES		
0201	Buggery*	7	Serious
0202	Gross indecency with a child*	5	
0203	Incest*	7	
	Incest with a female under 13		Serious
	Inciting a girl under 16 to have incestuous sexual intercourse		
0204	Indecent Assault*	5	
0205	Indecent behaviour/exposure	4	
0206	Rape*	8	Serious
	Assault with intent to commit rape or buggery		
	Attempted rape		
	Conspiracy to rape		
0207	Unlawful sexual intercourse with female under 13*	4	Serious
0208	Unlawful sexual intercourse with female under 16*	3	
0209	Other/unspecified sexual offences*	5	
03	DEATH OR INJURY BY DANGEROUS DRIVING		
0301	Death by dangerous driving*	8	Serious
	Causing death by aggravated vehicle taking		
	Causing death by dangerous driving when under the influence of drink or drugs		
0302	Injury by dangerous driving*	5	
	Causing injury by aggravated vehicle taking		
	Causing injury by dangerous driving when under the influence of drink or drugs		
04	MOTORING OFFENCES		
0401	Dangerous Driving	5	
0402	Driving under the influence of drinks/drugs	3	
0403	Driving whilst disqualified	5	
0404	Interfering with a motor vehicle	3	
0405	Refusing to give breath test	4	
0406	Road traffic/Additional Offences	2	
	Driving without due care and attention		
	Driving on a footpath or/and common land		
	Driving defective motor vehicle		
	Exceeding speed limit		
	Failure to wear a seatbelt		
	Failure to comply with a road traffic sign		
	Failure to give particulars after an accident		

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
	Failure to produce documents		
	Failure to report an accident		
	Failure to stop when requested by a constable		
	Failure to stop after an accident		
	Forge vehicle records/licence		
	No insurance		
	No L plates		
	No licence		
	No MOT		
	Not wearing protective headgear		
	Not well maintained indicators/stop/hazard and light reflectors		
	Pedal cycle offences		
0407	**Other/unspecified Motoring offences**	3	
05	ROBBERY		
0501	**Robbery***	6	**Serious**
	Assault with intent to rob		
	Conspiracy to rob		
06	DOMESTIC BURGLARY		
0601	**Aggravated burglary of a dwelling***	7	**Serious**
	Burglary with violence or threat of violence		
0602	**Burglary in a dwelling**	6	**Serious**
	Conspiracy to commit burglary of a dwelling		
0603	**Other/unspecified domestic burglary**	6	
07	NON-DOMESTIC BURGLARY		
0701	**Aggravated burglary of a non-dwelling***	7	**Serious**
	Burglary with violence or threat of violence		
0702	**Burglary in a non-dwelling**	4	
	Burglary with intent		
	Conspiracy to commit burglary of a non-dwelling		
0703	**Found on enclosed premises**	3	
0704	**Other/unspecified non-domestic burglary**	4	
08	VEHICLE THEFT/UNAUTHORISED TAKING		
0801	**Aggravated vehicle taking***	5	
	Injury to person, damage to property or car		
0802	**Being carried***	3	
	Being carried (aggravated)	4	
0803	**Vehicle taking**	4	
	Theft of motor vehicle		
	Unauthorised vehicle taking (TWOC/TADA)		
0804	**Other/unspecified vehicle theft/taking**	4	

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
09	THEFT AND HANDLING STOLEN GOODS		
0901	**Handling stolen goods**	3	**Serious**
	Receiving stolen goods		
	Undertaking or assisting in the retention, removal, disposal or realisation of stolen goods, or arranging to do so		
0902	**Theft**	3	
	Extracting electricity		
	Making off without payment		
	Going equipped for stealing		
	Intent to steal		
0903	**Other/unspecified theft & handling**	3	
10	FRAUD AND FORGERY		
1001	**Forgery**	3	
	Forgery, or use, of false prescription		
1002	**Fraud**	3	
	Acting as a peddler without certificate		
	Counterfeiting		
	Conspiracy to defraud		
	Fraudulent use of documents		
	Obtaining pecuniary advantage by deception		
	Obtaining property by deception		
1003	**Public/private service vehicle and rail fare evasion**	1	
1004	**Other/unspecified fraud and forgery**	2	
11	ARSON		
1101	**Arson endangering life**	6	**Serious**
	Arson reckless as to whether life is in danger		
1102	**Arson not endangering life**	5	**Serious**
1103	**Other/unspecified arson**	5	
12	CRIMINAL DAMAGE		
1201	**Criminal damage endangering life**	6	**Serious**
1202	**Other Criminal Damage Over £2000**	3	
	Equipped with intent to commit criminal damage		
	Threat to commit criminal damage		
1203	**Other Criminal Damage Under £2000**	2	
	Equipped with intent to commit criminal damage		
	Threat to commit criminal damage		
1204	**Other/unspecified criminal damage**	3	
13	DRUGS		
1301	**Permitting use of premises for use of Class B or Class C drug**	3	**Serious**

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
1302	**Possession – Class A drug**	3	
1303	**Possession – Class B drug**	2	
1304	**Possession – Class C drugs**	2	
1305	**Supply – Class A drug**	6	**Serious**
	Possessing a class A drug with intent to supply		
	Offering to supply a class A drug		
1306	**Supply – Class B drug**	4	**Serious**
	Possessing a class B drug with intent to supply		
	Offering to supply a class B drug		
1307	**Supply – Class C drug**	4	
	Cultivation of cannabis		**Serious**
	Possessing a class C drug with intent to supply		
	Offering to supply a class C drug		
1308	**Unlawful importation or exportation of a controlled drug**	5	**Serious**
1309	**Other/unspecified drug offence**	2	
14	**PUBLIC ORDER**		
1401	**Affray**	4	
1402	**Bomb Hoax**	5	
	Supplying false information about the presence of bombs		
	Dispatching articles to create a bomb hoax		
1403	**Breach of the Peace**	2	
	Behaviour likely to cause breach of the peace		
1404	**Drunk and Disorderly**	1	
1405	**Other Public Order Act offences**	2	
	Section 4 Public Order Act 1986 (fear or provocation of violence)		
	Section 4a Public Order Act 1986 (intentional harassment, alarm or distress)		
	Section 5 Public Order Act 1986 (harassment, alarm or distress)		
	Placing people in fear of violence		
1406	**Rioting**	6	
1407	**Violent disorder**	5	
1408	**Other/unspecified public order offence**	2	
15	**OTHER**		
1501	**Other specified offences**		
	Absconding from lawful custody	5	
	Air weapons offences	3	
	Blackmail	5	**Serious**
	Cruelty to animals or unlawful killing of animals	3	
	Firearms Act Offences (e.g. no firearm licence)	2	
	Interfering with witness/perverting justice	5	
	Obstruct police or fire service	3	
	Public nuisance (common law offence)	2	
	Resisting arrest	2	
	Sending indecent/offensive articles	4	
	Trespassing on a railway	2	

CODE	CATEGORY	SCORE	'SERIOUS OFFENCE' (ISSP)
1302	**Possession – Class A drug**	3	
1303	**Possession – Class B drug**	2	
1304	**Possession – Class C drugs**	2	
1305	**Supply – Class A drug**	6	**Serious**
	Possessing a class A drug with intent to supply		
	Offering to supply a class A drug		
1306	**Supply – Class B drug**	4	**Serious**
	Possessing a class B drug with intent to supply		
	Offering to supply a class B drug		
1307	**Supply – Class C drug**	4	
	Cultivation of cannabis		**Serious**
	Possessing a class C drug with intent to supply		
	Offering to supply a class C drug		
1308	**Unlawful importation or exportation of a controlled drug**	5	**Serious**
1309	**Other/unspecified drug offence**	2	
14	**PUBLIC ORDER**		
1401	**Affray**	4	
1402	**Bomb Hoax**	5	
	Supplying false information about the presence of bombs		
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1403	**Breach of the Peace**	2	
	Behaviour likely to cause breach of the peace		
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	Absconding from lawful custody	5	
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	Public nuisance (common law offence)	2	
	Resisting arrest	2	
	Sending indecent/offensive articles	4	
	Trespassing on a railway	2	