Individual differences and related emotion-detection abilities in cross-race context

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Abstract

The Dark Triad (DT) is a unified collection of three socially aversive personality traits: Machiavellianism, (subclinical) narcissism, and (subclinical) psychopathy. Although the DT is always coupled with negative social outcomes, evidence suggests that some aspects of its "darkness" provide a potential advantage for detecting emotions. This advantage has not been examined in a diverse sample. The present study aimed to investigate the association of DT traits with emotion detection abilities as measured through an emotion detection task. Given that the task was created from the CASMEII database which consisted of Chinese faces, it was also expected that the contact levels with the Chinese population would contribute to differentiating emotion detection performance. 170 participants who were from different ethnicities completed a set of online questionnaires. Results indicated that higher tendency towards primary psychopathy related to increased accuracy for judging disgust emotions. However, there was not any compelling evidence for the effect of exposure to the Chinese population on emotion judgement performance. The findings may imply that individuals with high levels of primary psychopathy have superior cognitive empathy, Emotional Intelligence and lie detection competencies, which is inconsistent with the vast majority of prior research.

Keywords: Dark Triad, emotion detection, Chinese-contact levels

Declaration

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Introduction

Emotion detection forms an important aspect of human communication. Individuals who are unable to detect and respond appropriately to the emotions expressed by others often face difficult situations where they may become socially isolated (Young, Hugenberg, Bernstein, & Sacco, 2012). This thesis focuses on the relationship between personality traits that involve forms of emotional manipulation, the ability to detect emotions from facial expressions, within the context of cross-cultural situations.

1.1 Emotion Detection and the Dark Triad Traits

1.1.1 Empathy and Emotional Intelligence

The Dark Triad (DT) is a unified collection of three socially aversive personalities: Machiavellianism, (subclinical) narcissism, and (subclinical) psychopathy (Paulhus & Williams, 2002). These traits are accompanied by a wide range of negative personal and social outcomes. Machiavellians, for instance, have a strong desire to exact revenge on others, and engage in duplicitous behaviours (Jones & Paulhus, 2017). Narcissists perform aggressive and hostile acts when someone threatens their egos, and their egocentrism leads to toxic romantic relationships (Miller, Widiger, & Campbell, 2010). Psychopaths tend to engage in various forms of criminality such as sexual assault and murder (Megargee, 2009). Further, the three dark personalities share a high level of callousness and selfishness (Veselka, Schermer, & Vernon, 2012; Jones & Figueredo, 2013; Jones & Paulhus, 2014). Thus, there is a consensus that the DT traits are associated with an emotional deficit: lack of empathy (Jonason, Li, Webster, & Schmitt, 2009; Jonason & Krause, 2013; Jonason, Lyons, Bethell, & Ross, 2013; Giammarco & Vernon, 2014). Limited empathy essentially refers to the impaired capacity to understand and share others' mental experiences (McHoskey, Worzel, & Szyarto, 1998). Research has indicated that

subclinical psychopathy predicted low general empathy (Del Gaizo & Falkenbach, 2008;

Mahmut, Homewood, & Stevenson, 2008). In line with the findings regarding psychopathy,

Machiavellians were unable to understand emotions in social encounters, and they demonstrated

a general emotional impoverishment (Ali & Chamorro-Prem-uzic, 2010; Barlow, Qualter, &

Stylianou, 2010). Similar to Machiavellianism, narcissism was also associated with reduced

empathic competencies (Watson, Grisham, Trotter, & Biderman, 1984; Watson & Morris, 1991).

On the other hand, the empathy impairments in the DT traits may be overstated. Theorists

have doubted that "empathy" can be measured as a unidimensional construct (Jonason & Kroll,

2015). That is, the construct can be divided into affective and cognitive empathy, which have

distinct neural and behavioural correlates (Shamay-Tsoory, Aharon-Peretz, & Perry, 2009).

Affective empathy is conceptualised as the susceptibility to emotional contagion, understood as

feeling what others feel, whereas cognitive empathy refers to the ability to recognise and infer

the emotions and emotional states of others, without necessarily feeling them (Jolliffe &

Farrington, 2004; Jonason et al., 2013; Czarna, Wróbel, Dufner, & Zeigler-Hill, 2015). Indeed,

the prior experiments using a two-dimensional measure of empathy failed to demonstrate the

same empathy deficits in all three dark personalities. Wai and Tiliopoulos (2012) revealed that

people who scored higher in the measurements of DT traits were more strongly associated with

affective empathy deficits. In order to assess cognitive empathy, the researchers recruited a facial

recognition task which asked observers to select the emotion they believed each image

expressed. The results illustrated that there was no compelling evidence for reduced cognitive

empathy in narcissism and certain aspects of psychopathy. Moreover, another study found

increased cognitive empathy in narcissism, which suggested that narcissists might have normal

or better emotion reading skills (Heym et al., 2019). Collectively, the findings did not support the

prediction that cognitive empathy remains intact for Machiavellianism. One explanation is that the facial recognition task in Wai and Tiliopoulos (2012) lacked ecological validity. The participants in the task were asked to look at static photos, while the recognition of emotions usually occurs in spontaneous facial expressions and requires a degree of assessment in micro-expression changes (Wai & Tiliopoulos, 2012). Therefore, this defect reinforces the need for a more advanced measure of cognitive empathy to better detail the link between emotion recognition abilities and the DT traits.

In addition, being able to empathise is an important predictor of Emotional Intelligence (EI) (Hare, 1991). EI encompasses the capability to recognise, utilise, understand, and monitor emotions in oneself and others (Petrides, Frederickson, & Furnham, 2004; Mayer, Caruso, & Salovey, 2016). Emotionally intelligent individuals have expertise in accurately perceiving emotions, reading facial expressions, and even detecting nuanced micro-expressions during conversations (Miao, Humphrey, Qian, & Pollack, 2019). These skills provide a useful tool to enhance interpersonal relationships such as effective social exchanges with peers in the workplace (Miao, Humphrey, & Qian, 2017). Considering that people with high DT traits were less likely to evoke empathic responses (Paulhus & Williams, 2002), they are prone to have low EI (Ciarrochi, Chan, & Caputi, 2000). This phenomenon has been shown by many studies (Ames & Kammrath, 2004; Austin, Farrelly, Black, & Moore, 2007; Ali, Amorim, & Chamorro-Premuzic, 2009; Ermer, Kahn, Salovey, & Kiehl, 2012; Marissen, Deen, & Franken, 2012; Copestake, Gray, & Snowden, 2013; Jauk, Freudenthaler, & Neubauer, 2016). However, the relationship between the high DT and low EI is not always observed. Despite the fact that the high levels of EI appears to be widely valued as a genuinely positive addition to interpersonal behaviours, it also entitles people to exploit social interaction partners through emotional

manipulation (Miao et al., 2019). That is, the advanced emotion recognition capability of high EI is used in a strategic and manipulative way to manage others' emotions to achieve personal goals (Fix & Fix, 2015; Kilduff, Chiaburu, & Menges, 2010; Nagler, Reiter, Furtner, & Rauthmann, 2014).

The maleficent intent of EI is closely aligned with the core characteristics described by all DT traits: exploitation and manipulation (Jones & Paulhus, 2014). Therefore, individuals that score higher in the DT traits may possess high EI rather than low EI, and correspondingly are more sensitive to emotion perception. Positive associations with EI have emerged in Machiavellianism (Esperger & Bereczkei, 2012), narcissism (Delič, Novak, Kovačič, & Avsec, 2011; Vonk, Zeigler-Hill, Mayhew, & Mercer, 2013; Vonk, Zeigler-Hill, Ewing, Mercer, & Noser, 2015), and psychopathy (Petrides, Vernon, Schermer, & Veselka, 2011; Veselka, Schermer, & Vernon, 2012). A further study reported that narcissism had a correlation with heightened emotion recognition abilities (Konrath, Corneille, Bushman, & Luminet, 2014). Participants in the study were instructed to complete the Reading the Mind in the Eyes Test (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001), which is a commonly used measurement for emotion reading in non-clinical populations (Chapman et al., 2006; Luminet, Grynberg, Ruzette, & Mikolajczak, 2011; Tso, Grove, & Taylor, 2010). The mean correct response on reading emotions was about 74% for those who scored higher in narcissism (Konrath et al., 2014, p. 135). In addition, the psychopathic traits also influence observers' competencies to identify subtle micro-expressions. Demetrioff, Porter, and Baker (2017) assessed the emotional inferences that perceivers made for the briefly presented emotional expressions. It was found that the mean accuracy rate on micro-expression tasks was 60.53% for participants who had high levels of subclinical psychopathy. The existing studies demonstrated

the relationship of emotion recognition with narcissistic and psychopathic traits, but not with Machiavellian personalities. While Machiavellians are skilled at social exploitation to successfully manipulate others (Wilson, Near, & Miller, 1996; Jones & Paulhus, 2009), additional analyses are necessary to articulate how each DT trait contributes to the prediction of emotion recognition.

1.1.2 Lie Production and Lie Detection

Given that malevolent tendencies are a defining component of the DT, a growing body of research has proposed that people scoring higher in the DT traits are more inclined to deceive others (Azizli, 2016). Deception comprises of two forms: low-stakes and high-stakes lies. Low-stakes scenarios involve low or even no risk for deceivers and are commonplace in social contexts (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). In daily life, people regularly perform low-stakes lies about their preferences, attitudes, and opinions to avoid disapproval and conflicts. In contrast, the high-stakes lies involve high risk and cause a substantial magnitude of loss or gain for deceivers (Gozna, Vrij, & Bull, 2001). For instance, a criminal being arrested because he lied about committing a murder. Further, "Manipulativeness", as the principal feature of the DT traits (Paulhus & Williams, 2002), is the main drive for individuals to exhibit both low- and high-stakes deception (Gozna et al., 2001). Data from many resources have identified that Machiavellians frequently engage in self-serving lies in various social settings to gain dominance (DePaulo & Rosenthal, 1979; Geis & Moon, 1981; Fehr, Samsom, & Paulhus, 1992; Kashy & DePaulo, 1996; McLeod & Genereux, 2008; Jonason, Lyons, Baughman, & Vernon, 2014). Narcissists use deceptive tactics in academic contexts to manage their impression and maintain a grandiose image (Morf, Horvath, & Torchetti, 2011; Baughman, Jonason, Lyons, & Vernon, 2014). Subclinical psychopaths habitually employ cheating strategies in short-term

mating and academic contexts (Jonason, Li, Webster, & Schmitt, 2009; Jonason, Luévano, & Adams, 2012; Baughman et al., 2014).

Moreover, it is suggested that there is an association between lie production and lie detection. Wright, Berry, and Bird (2012) indicated that individuals who are proficient at lying are more successful in detecting lies. A study demonstrated that people with the high DT traits who frequently engaged in duplicitous behaviours had better lie detection abilities (Lyons, Croft, Fairhurst, Varley, & Wilson, 2017). Experiments suggested that observers rely on two categories of information: verbal and non-verbal cues, to uncover deceit (Zuckerman, DePaulo, & Rosenthal, 1981; Lyons, et al., 2017). The non-verbal cues include facial expressions that are described as leaked emotions which reveal what liars attempt to hide (Ekman & Friesen, 1969). For instance, when deceivers fake enjoyment that they are actually not experiencing, they are likely to show feigned smiles instead of genuine smiles (Ekman, Sullivan, & Felthous, 2006). The two types of smiles activate different facial muscles and display different appearances (see Figure 1). Further, facial expressions are difficult to betray because they are involuntary (Porter & ten Brinke, 2010). Thus, a considerable amount of literature has highlighted that the identification of facial expressions is a valuable illustration of deception (Duchenne, 1990; Hess & Kleck, 1990; Ekman, Davidson, & Friesen, 1990; Ekman, 2003; Frank, Ekman, & Friesen, 2005; Porter & ten Brinke, 2008). On condition that Machiavellians, narcissists, and psychopaths possibly have superior liar-catching abilities which entitle them to be sensitive about facial expressions, it is expected that the higher levels of DT traits may correlate with enhanced emotion recognition competencies.
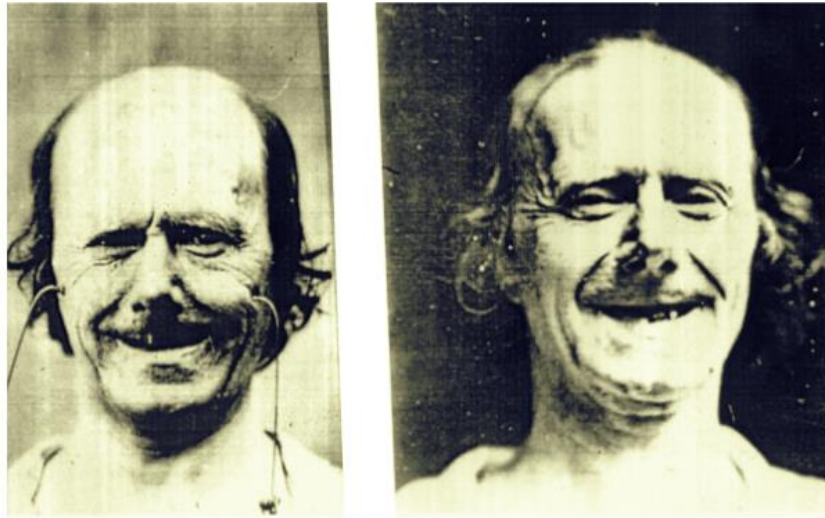
Figure 1. The left is a feigned smile and the right is a genuine smile. Adapted from "From flawed self-assessment to blatant whoppers: The utility of voluntary and involuntary behavior in detecting deception," by P. Ekman, M. O'Sullivan, and A. R. Felthous, 2006, *Behavioral Sciences & the Law, 24*, p. 677.

1.2 Emotion Detection

1.2.1 Basic Emotions

Since Darwin's evolutionary and biological account of facial expressions, much work in this domain emphasises that six emotions (e.g. disgust, anger, fear, happiness, sadness, and surprise) are universally recognised, regardless of culture (Ekman, Sorenson, & Friesen, 1969; Ekman & Friesen, 1971; Ekman et al., 1987; Izard, 1994). These basic emotions have been considered as discrete units that constitute the complicated emotion system (Ekman, 1992). However, some researchers argued that the basic emotions overlap, and this challenges the emotion detection abilities of people. Empirical research has tested the basic emotion recognition skills in Eastern Asians. The results demonstrated that Eastern Asians were confused about the discrimination between disgust and anger, fear and surprise (Blais et al., 2008; Jack, Blais,

Scheepers, Schyns, & Caldara, 2009; Jack, Caldara, & Schyns, 2012; Jack, Garrod, Yu, Caldara, & Schyns, 2012). Comparably, Western Caucasians exhibited the poor emotion discrimination between fear and surprise, disgust and anger (Jack, Garrod, & Schyns, 2014). The recognition confusion between the two pairs may be associated with a cognitive mechanism named dimensional perception (Schlosberg, 1954; Katsikitis, 1997; Russell, 1997). Dimensional perception posits two fundamental dimensions: valence, which represents a pleasure-unpleasure continuum, and arousal, which refers to the energy level of affective experience (Russell, 1980; Russell & Bullock, 1985) (see Figure 2). The basic emotions except surprise and happiness (e.g. sadness, anger, fear, and disgust) share a negative affective valence which blurs their distinctiveness and makes them interfere with each other during recognition (Mendolia, 2007).
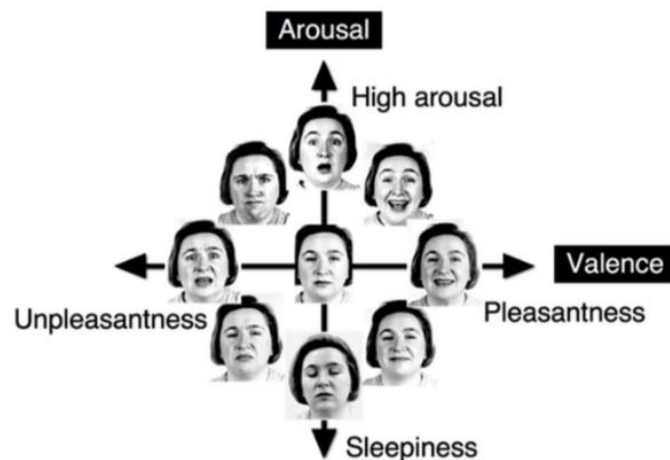
Figure 2. Dimensional Theory. Adapted from "The implicit processing of categorical and dimensional strategies: an fMRI study of facial emotion perception," by Y. Matsuda, T. Fujimura, K. Katahira, M. Okada, K. Ueno, K. Cheng, and K. Okanoya, 2013, *Frontiers in Human Neuroscience, 7*, p. 2.

On the other side, happiness is the only basic emotion that clearly presents a positive affect. Accordingly, the unique affective value would facilitate a detection advantage for happy facial expressions. In the studies of emotion recognition, participants are typically asked to judge the presenting facial expressions from a limited number of preexisting emotion choices. These studies have consistently proved that the expressive information in happy faces is more effectively and uniquely captured (Calder, Young, Keane, & Dean, 2000; Leppänen, Tenhunen & Hietanen, 2003; Calvo & Lundqvist, 2008; Tottenham et al., 2009). This effect is also consistent across cultures. A meta-analysis reviewed 39 studies that assessed emotion identification performance on participants who were from diverse cultural backgrounds such as Indians, Europeans, Chinese and so on. The researchers found that crossing different cultures, the accuracy rate of happy emotion judgement had been higher than the other five basic emotions from 1992 until 2010 (Nelson & Russell, 2013). The evidence of the perceptual sensitivity for happiness is convincing, yet it is not flawless. One major deficit is that the facial expression stimuli in most studies are posed photographs drawn from databases including the Pictures of Facial Affect (Ekman & Friesen, 1976), Karolinska Directed Emotional Faces (KDEF; Lundqvist, Flykt, & Öhman, 1998), and NimSTIM (Tottenham et al., 2009). However, in Elfenbein and Ambady's (2002) meta-analytical review, they found that the cross-cultural accuracy of emotions (e.g. happiness) in the experiments that used spontaneous facial expressions (39.5%) was lower than that in those used static expressions (46%). This suggests that posed photographs may inflate the superiority of happiness recognition. Moreover, with a forced-choice format (e.g., choose one emotion from a list of emotions) in numerous studies, participants are indeed required to accomplish a discrimination task (e.g. happiness vs disgust vs sadness) which allows a guessing strategy to be used, instead of a recognition task dependent on

their judgments (Nelson & Russel, 2013). Consequently, observers cannot indicate that the expression conveys multiple emotions, nor can they state that an emotion is not included in the list (Russell, 1994; Frank & Stennett, 2001). Therefore, the standard method of forced-choice may also oversimply the observers' responses and overplay the role of superior happiness recognition.

1.2.2 Same-Race Effect and Cross-Race Effect

The basic emotions are claimed to be universal irrespective of cultural variability and ethnic origins (Ekman & Friesen, 1971). Nonetheless, the ability to recognise emotions from the face can vary as a function of several different factors. One of the best documented examples is that perceivers have more accurate recognition memory for same-race (SR) faces compared to cross-race (CR) faces (Cross, Cross, & Daly, 1971; Shepherd & Deregowski, 1981; Lindsay, Jack, & Christian, 1991; Sporer, 2001). This cross-race effect (CRE) (also refers to SR advantage or CR disadvantage) has been widely replicated across a variety of experimental paradigms and cultural settings, as well as being confirmed by several meta-analytical reviews (Shapiro & Penrod, 1986; Bothwell, Brigham, & Malpass, 1989; Anthony, Copper, & Mullen, 1992; Meissner & Brigham, 2001). The CRE has two theoretical explanations: perceptual expertise and social cognition (Young, Hugenberg, Bernstein, & Sacco, 2012). As specified by perceptual expertise theory, more experience in processing SR faces leads to more privileged decoding of SR faces resulting in more accurate recognition of SR facial expressions (Rhodes, Brake, Taylor, & Tan, 1989; Tanaka, Kiefer, & Bukach, 2004). Thus, the SR advantage or CR disadvantage reflects the differential amount of racial experience such that individuals with more exposure to other-race faces would decrease or even reverse CRE. For instance, a group of Asian children who had been raised by Caucasians showed a comparable recognition ability between Asian and

Caucasian faces (De Heering, De Liedekerke, Deboni, & Rossion, 2010; Walker & Hewstone, 2006b). In the same vein, another group of Korean adoptees who had been living in European Caucasian families between the ages of 3 to 9 demonstrated a recognition advantage for Caucasian photographs relative to Asian photographs (reversal CRE) (Sangrigoli, Pallier, Argenti, Ventureyra, & De Schonen, 2005). The two findings are attributed to the substantially increased experience or contact in childhood with the CR faces.

Furthermore, the experience hypothesis is not only restricted to children who are in the sensitive periods for the development of face recognition system (Sangrigoli et al., 2005), but also applies to adults. Adults who self-reported a relatively high contact with racial outgroups (Hancock & Rhodes, 2008) or had lived in an area predominated by other races (Rhodes, Ewing, Hayward, Maurer, Mondloch, & Tanaka, 2009) both have decreased CR disadvantage. Likewise, the perceivers who had received intensive training on CR faces in laboratories also enhanced their CR recognition (Elliott, Wills, & Goldstein, 1973; Goldstein & Chance, 1985; Tanaka & Pierce, 2009). Collectively, both long-term developmental experience and short-term induced training on racial outgroups can modulate the CR recognition deficit. In addition to the different contact levels of SR and CR, the differential mental presentations of SR and CR are at the root of the perceptual expertise theory. The SR advantage employs a configural technique which extracts relations between the fixed properties from the SR faces (e.g. nose, mouth, and eyes) (Rhodes et al., 1989; Michel, Rossion, Han, Chung, & Caldara, 2006; Tanaka et al., 2004). Such relations allow perceivers to process a face as a unified object rather than a set of separate facial features (Maurer, Le Grand, & Mondloch, 2002). While the CR face processing uses a piecemeal strategy, in which observers perceive the facial features in an isolated manner (Diamond & Carey, 1986; Rhodes et al., 1989). It is clear that in SR processing, people recruit a more

effective facial representation than in CR processing. However, when participants are offered an opportunity to gain extensive exposure to CR faces, they may decode CR faces in a configural way instead of a piecemeal manner. For example, a group of participants who had recognition deficits for CR faces received a one-hour (220 exposures) training in the laboratory which facilitated their familiarity with outgroup members. After training, the experiment results showed that their CR disadvantage disappeared and they recruited the same configural processing mechanism as used for SR faces (McKone, Brewer, MacPherson, Rhodes, & Hayward, 2007). Thus, not only CRE but also the mental representation of CR can be modified through interracial contact.

1.3 Dark Triad

1.3.1 Taxonomy, Nature, and Definition

The Dark Triad (DT) of Machiavellianism, narcissism, and psychopathy is a concept aiming to describe antagonistic and malevolent personality traits in the non-clinical population (Paulhus & Williams, 2002). The three traits share some common features but also own several unique profiles (Dowgwillo & Pincus, 2017). Callousness (empathy deficits) and interpersonal manipulation largely account for the overlap facets of Machiavellianism, narcissism, and psychopathy (Jones & Figueredo, 2012; Wai & Tiliopoulos, 2012; Jones & Paulhus, 2014). *Machiavellianism* is named after the political strategist, Niccoló Machiavelli, characterised as manipulative tactics, cynical worldview and lack of morality (Christie & Geis, 1970). *Narcissism* is defined as a grandiose view of self, entitlement, as well as the needs of admiration for ego-reinforcement (Campbell, Rudich, & Sedikides, 2002; Ames, Rose, & Anderson, 2006; Jones & Paulhus, 2014). Psychopathic individuals display affective deficits, disinhibited and antisocial behaviours, as well as high impulsivity (Hare, 1970). *Psychopathy* is a multidimensional

construct which includes primary and secondary psychopathy (Levenson, Kiehl, & Fitzpatrick, 1995). Primary psychopaths perform affective coldness, selfishness, manipulation, and deception, whose behaviours are deliberately planned. In contrast, secondary psychopaths have the emotionally unstable character that can be caused by adverse environments (e.g. poor parenting style), which leads to impulsive and irresponsible behaviours (Wai & Tiliopoulos, 2012; Muris, Merckelbach, Otgaar, & Meijer, 2017).

1.3.2 Gender Effects

The DT traits have a more robust linkage with males as compared to females (Paulhus & Williams, 2002). The most pronounced findings on gender differences are the psychopathic personalities, such that males score higher in the measurements of psychopathy (Giammarco & Vernon, 2014; Jauk et al., 2016). The characteristics of psychopathy (e.g. manipulation and exploitation) appear to capture male-typical traits (Cale & Lilienfeld, 2002), which facilitate males to achieve success in various social contexts (Jonason et al., 2009; Jonason et al., 2014). The less pronounced findings are on Machiavellianism and narcissism. Available studies revealed that Machiavellian features (e.g. strategic planning and manipulation) are more strongly present in men instead of women (Krampen, Effertz, Jostock, & Mülle, 1990; Baughman et al., 2014; Szabó & Jones, 2019). For narcissism, a meta-analysis found that males are more narcissistic than females (Grijalva et al., 2015). The gender difference was in a small to medium effect size. Also, men mainly exhibit socially aversive features of narcissism (e.g. exploitation, entitlement, and self-sufficiency). The high prevalence of the DT traits in men may be due to gender stereotypes. Men and women are born with some biological specialisations (e.g. testosterone or uterus) that then went on to determine the gendered division of labor in ancient times (e.g. manual labor or child caregivers) (Heilman, 2001). This then, in turn, gave rise to

social role beliefs and gender identities (Wood & Eagly, 2002). According to this perspective, men are stereotyped as *agentic* which requires "competitiveness, dominance, assertiveness, and goal achievements", whereas women are stereotyped as *communal* which ought to possess "friendliness, nurturance, and tenderness" (Prentice & Carranza, 2002; Vogel, Wester, Heesacker, & Madon, 2003; Grijalva et al., 2015). The *agentic* characteristics are more compatible with the DT personality traits (Jones & Paulhus, 2011). As a consequence, men perform more prototypical "dark" behaviours, and face pressure to behave as such (Rudman, Moss-Racusin, Phelan, & Nauts, 2011). Accordingly, it is possible for men to have more accurate emotion judgement compared to women based on the potential connection between higher DT traits and higher emotion detection ability.

1.4 Exploratory Analysis for Age

There is a series of studies that obtained significant age group differences in emotion identification (Sullivan & Ruffman, 2004; Isaacowitz et al., 2007). Most of the research findings reached an agreement that older adults have difficulties in recognising negative emotions: anger, sadness, and fear (Isaacowitz et al., 2007). In contrast, there were less consistent findings of emotion recognition deficits in happiness (positive emotion) and disgust (negative emotion) as age increased (Ruffman, Henry, Livingstone, & Phillips, 2008). The age differences in identifying emotions may partly be explained by two reasons: changes in neural systems (Calder et al., 2003) and visual acuity (Humes, Busey, Craig, & Kewley-Port, 2009). The function of neural systems involved in labelling emotions (mainly frontal and temporal areas) can reduce with aging (Raz et al., 2005). Furthermore, age changes are associated with a decline in visual acuity which contributes to emotion recognition (Humes et al., 2009). Therefore, age may impact the ability to detect emotions – particularly negative emotions (e.g. anger, sadness, fear, and

disgust). Rather than treat age as a factor, it will be controlled in our data analyses to avoid confounding with other contributing independent variables.

1.5 Summary

Research suggests that the DT traits have multi-faceted and complicated relationships with empathy, Emotional Intelligence, lie production and lie detection (Petrides et al., 2011; Veselka et al., 2012; Wright, Berry, & Bird, 2012; Esperger & Bereczkei, 2012; Vonk, et al., 2013; Jonason et al., 2014; Baughman et al., 2014). These relationships imply that the DT traits may be a valuable predictor for emotion detection skills. Few studies explore this topic and only provide evidence for narcissism and certain aspects of psychopathy (Wai & Tiliopoulos, 2012; Konrath et al., 2014; Demetrioff, Porter, & Baker, 2017). The current study aims to bridge this gap and better detail the association between each dark triad membership and emotion recognition. Importantly, this study will use a unique cross-race stimulus set, with videos rather than static images to better measure emotion recognition performance.

1.6 Aims and Hypotheses

Aim 1

We will assess how the varying levels of DT traits influence the emotion detection competencies in the context of an emotion recognition task. It is hypothesised that participants whose scores are higher in the measurements of DT traits will be more skillful in recognising emotions.

Aim 2

There is evidence to show that the DT personalities are male-typical traits. Therefore, we will investigate whether gender differences contribute to differentiating emotion detection

abilities. It is hypothesised that males with a high level of DT traits will perform better in the emotion recognition task than females.

Aim 3

This study will use a facial expression database from the Chinese population to examine whether race-contact levels will play a role in emotion detection. It is expected that more exposure to Chinese faces relates to higher accuracy rate on emotion recognition performance.

Aim 4

Considering the superior recognition of positive emotions compared to negative emotions, the current study will use spontaneous facial expressions and improved answer format to explore whether emotional valence affects emotion detection. It is predicted that observers will be more successful in detecting positive emotions than negative emotions.

Method

2.1 Participants

Participants ($N = 233$) consisted of first-year psychology students ($N = 172$) at the University of Adelaide recruited from the Research Participation Pool, and members of the general public ($N = 61$) recruited from social media and networking. The participants aged from 18 to 68 years ($M = 21.75$, $SD = 7.25$) and included 164 females, 67 males, and 2 who answered "Other". Their ethnicities were: 56.2% Caucasian, 0.9% Aboriginal and Torres Strait Islander, 1.3% African, 36.5% Asian, and 5.2% Other. First-year psychology students completed the study in exchange for course credits and members of the general public entered a draw to win a gift voucher. Participants' selection excluded those who were under 18 years old and those without reasonable English reading skills.

2.2 Materials

2.2.1 Demographics

The questionnaire asked about age, gender, ethnicity, education level ('Bachelor degree' to 'Doctoral degree'), as well as prior formal training on emotion detection. If participants chose 'Asian' or 'Other' ethnicities, they were asked to define their answers. If participants had received formal training, they would need to specify the nature of that training as well.

2.2.2 Racial Contact Questionnaire

The Racial Contact Questionnaire was used to assess contact levels with Caucasian and Chinese people (Hancock & Rhodes, 2008). This measure comprises 15 Likert-scale questions (1 = *Very strongly disagree*, 6 = *Very strongly agree*), 7 questions to indicate the contact with Caucasians, and 8 questions to indicate the contact with Chinese (see Appendix A). The reliability of the questionnaire is good, with high Cronbach's alpha for Caucasian participants (α

= .92, own-race; α = .82, other-race) and Chinese participants (α = .89, own-race; α = .94, other-race).

2.2.3 Dark Triad Personalities: Machiavellianism, Narcissism, Psychopathy

Dark Triad personality traits were independently measured using three scales: Machiavellianism Inventory-Version IV (Mach-IV), 16-item Narcissistic Personality Inventory (NPI-16), and Levenson Self-Report Psychopathy Scale (LSRP).

Mach-IV

The standard measure of Machiavellianism is Mach-IV (Christie & Geis, 1970; Furnham, Richards, & Paulhus, 2013; Jones & Paulhus, 2014). Mach-IV is a 20-item, self-reported scale that measures individuals' Machiavellian tendencies (see Appendix B). Respondents were required to rate each item on a 5-point Likert-scale from 1 (strongly disagree) to 5 (strongly agree). In the source study, the mean split reliability of Mach-IV was .79 (Christie & Geis, 1970, p. 22). A large body of literature has further confirmed the reliability and validity of Mach-IV over the following years (Fehr et al., 1992; Ramanaiah, Detwiler, & Byravan, 1994; Jones & Paulhus, 2009).

NPI-16

The most widespread, self-report measurement of subclinical narcissism is the NPI-16 (Ames, Rose, & Anderson, 2006; Furnham, Richards, & Paulhus, 2013). This measurement tool has 16 pairs of forced-choice items (see Appendix C). Respondents chose one item that was closest to their feelings from each pair. The NPI-16 had adequate reliability, with Cronbach's alpha ranging from .65 to .78. Further, this scale highly correlated ($r = .90$) with another "gold standard" measurement of narcissism-40-item Narcissistic Personality Inventory (NPI-40) (Ames, Rose, & Anderson, 2006).

LSRP

The LSRP is a 26-item, self-reported measurement that assesses individuals' subclinical psychopathic tendencies (see Appendix D) (Levenson, Kiehl, & Fitzpatrick, 1995). This measurement is the only open access scale that includes primary psychopathy and secondary psychopathy. The primary psychopathy comprises of 16 items to indicate selfishness, empathy deficits, and manipulation. The secondary psychopathy composes of 10 items to indicate impulsivity and a self-defeating lifestyle. Respondents rated each item on a 4-point Likert-format ranging from 1 (disagree strongly) to 4 (agree strongly). The reliability for the LSRP (Cronbach α = .83) (Miller, Gaughan, & Pryor, 2008), the primary psychopathy (Cronbach α = .82), and the secondary psychopathy (Cronbach α = .63) was adequate (Levenson, Kiehl, & Fitzpatrick, 1995).

 2.2.4 Emotional Expression Stimuli

The emotion detection task was created from the CASME II database, obtained with permission for use from the University of Chinese Academy of Sciences in Beijing. The database consisted of video clips of Chinese men and Chinese women attempting to either neutralise or suppress their facial expressions when they were watching high arousal videos (Yan et al., 2014). The current study used 20 video clips which included two facial emotions: disgust (10 clips) and happiness (10 clips) (see Appendix E). Each clip was presented 5 times in a randomised order.

A pilot study was conducted to determine the appropriate number of viewing times for the video clips. The mode in the preliminary data set was 5 times (see Appendix F). Moreover, in order to balance the task between being too difficult (e.g. due to emotion recognition confusion) or too easy (e.g. comparisons between positive and negative emotions), this study presented five emotion categorisation options: happiness, disgust, anger, fear, and "other". Participants were

asked to indicate which of the five possible emotion options that the person in the video displayed. If they chose "other", they would specify their own judgements. This non-forced choice format was included to help reduce guessing. The purpose of the emotion detection task was to test individuals' emotion detection abilities.

2.3 Research Design

The present study is a single factor, within-subjects design (positive emotion vs negative emotion). The dependent variable was emotion detection ability. The measured covariates were the Dark Triad personality score, gender (males vs females), and Chinese-contact levels.

2.4 Procedure

Participants read an information sheet and provided their consent to take part in the study. Following this, they completed an online package of questionnaires in Survey Monkey™ which comprised the demographic questionnaire, racial contact questionnaire, emotion detection task, Mach-IV, NPI-16, and LSRP. Participants received an instruction to finish the emotion detection task as soon as they could without hesitation. Participants were ultimately recommended to sign a confidentiality treaty (see Appendix G), due to the privacy policy of the University of Chinese Academy of Sciences in Beijing, which would ensure that they did not share the videos or record them.

2.5 Ethics

Ethics approval was granted by the Human Research Ethics Subcommittee at the University of Adelaide, approval number 19/38 (see Appendix H). Participants selected relevant consent options before they commenced the study. They were informed that their identifiable data would be destroyed on completion of the project and non-identifiable data would be published in the Open Science Framework.

Results

The following section presents the results of the current study. The methods used to analyse the results will be described in detail. Data screening will be discussed first. Following this, descriptive statistics will be explored, and the values obtained from our sample are presented in Tables 1-2. Finally, the data are assessed to address the individual aims of the research.

3.1 Data Screening

Inspection of our data revealed that 6 participants did not give permission to record their results and 6 participants did not sign the consent form. Furthermore, 3 participants made multiple attempts at the experiment, 36 did not complete the questionnaires and 12 responses were disingenuous. Consequently, 63 participants in total were excluded from the study. After exclusion, normality tests were conducted to investigate the distributions of the dependent variable. These distributions were deemed suitable for planned analysis and no data were transformed.

3.2 Descriptive Statistics

The participant characteristics are shown in Table 1. A total of 170 participants remained in the data set, with 42 males and 128 females. Participants were predominantly composed of young adults, with 91.8% of the sample under the age of 25 years. The level of education was clustered around a bachelor's degree, due to a large proportion of first-year university students participating in this study. Over half of the respondents were Caucasians and approximately 30% of the participants were Asians. It is worth noting that every participant in the experiment had never received any professional training on emotion detection or recognition before.

Table 1

Participant Characteristics (N = 170)

Characteristics	N (%)[a]	
Age, Mean *(SD)*	21.34	(6.31)
Gender		
Male	42	(24.7)
Female	128	(75.3)
Education Level		
Bachelor	131	(77.1)
Bachelor Honours	7	(4.1)
Graduate Certificate	2	(1.2)
Graduate Diploma	1	(0.6)
Masters	12	(7.1)
Doctoral	1	(0.6)
Other	16	(9.4)
Ethnicity		
Asian	56	(32.9)
African	2	(1.2)
Aboriginal and Torres Strait Islander	2	(1.2)
Caucasian	102	(60.0)
Other	8	(4.7)

[a]Values are expressed as total N (%), except age which is expressed as mean *(SD)*.

An overview of descriptive statistics for dependent and independent variables, including statistical comparison between males and females, is exhibited in Table 2. The measurement scales used in this study were tested for internal consistency by conducting reliability analyses. The secondary psychopathy scale did not reach an acceptable reliability, with a fairly low alpha value (Cronbach α = .40). In contrast, the narcissism measurement reached an acceptable but still relatively weak reliability (Cronbach α = .68). The reliability of primary psychopathy and Machiavellianism scales was good, with alphas varying from .75 to .86. The race-contact level measure was strongly reliable (Cronbach α = .92).

Independent sample t-tests indicated that males tended to be more psychopathic than females, with the most pronounced differences in primary psychopathy, $t(168) = 2.60$, $p = .010$, $d = .43$. Although the sex effect in Machiavellianism was not statistically significant, there was a small mean difference between male ($M = 56.05$, $SD = 8.39$) and female Machiavellians ($M = 53.25$, $SD = 8.46$), $t(168) = 1.86$, $p = .064$, $d = .33$. However, mean scores for men were not notably higher than those for women in secondary psychopathy and narcissism. The mean tendency of secondary psychopathy in females ($M = 21.24$, $SD = 3.39$) was slightly higher compared to males ($M = 21.07$, $SD = 3.26$).

Emotion detection ability was mirrored by emotion judgement accuracy, which was determined by calculating the mean accuracy scores for the emotion detection task overall, and for each of the two emotions separately (happiness and disgust). The respondents were awarded one point for one correct answer and the full mark was 20 (10 for happiness and 10 for disgust). Overall, the observers had a mean emotion judgement accuracy rate of 43.45% ($M = 8.69$, $SD = 2.89$). One sample t-tests revealed that participants were substantially more accurate at judging each individual emotion than they would be using the chance level (set at 0.2, as our task has five

emotion choices): happiness $t(169) = 33.70$, $p < .001$, $d = 2.59$, disgust $t(169) = 26.91$, $p < .001$,

$d = 2.07$.

Table 2

Descriptive Statistics for Dependent and Independent Variables with Comparison between Group

Scores for Females (N = 128) and Males (N = 42)

Characteristics	Overall M (SD)	α	Females M (SD)	Males M (SD)	t (df)[a]	p	Cohen's d
Primary	28.98 (7.58)	.86	28.13 (6.84)	31.57 (9.08)	2.60	.010	0.43
Secondary	21.20 (3.35)	.40	21.24 (3.39)	21.07 (3.26)	-.29	.775	0.05
Machiavellianism	53.94 (8.51)	.75	53.25 (8.46)	56.05 (8.39)	1.86	.064	0.33
Narcissism	3.12 (2.61)	.68	3.02 (2.46)	3.43 (3.03)	.89	.374	0.15
Emotion detection	8.69 (2.89)	-	8.60 (2.79)	8.95 (3.20)	.68	.497	0.12
Happiness	4.91 (1.82)	-	4.88 (1.82)	5.02 (1.84)	.46	.648	0.08
Disgust	3.78 (1.73)	-	3.73 (1.68)	3.93 (1.91)	.65	.514	0.11
Chinese Contact	26.05 (9.52)	.92	-	-	-	-	-

Note. Primary: Primary Psychopathy; Secondary: Secondary Psychopathy. Because of the nature of the

emotion detection tasks, the internal consistency is not applicable to emotion detection accuracy,

happiness accuracy, and disgust accuracy. Due to the nature of the Chinese-contact questionnaire, gender

is not a suitable comparative method for this measurement.

[a]Degrees of freedom for all the listed variables is 168.

3.3 Aim 1

Before investigating Aim 1, the possible predictors for emotion judgement accuracy: age, gender, and Chinese-contact levels were first entered into a multiple regression model. Findings are presented in Table 3. It was shown that age significantly predicted decreased accuracy for happy emotion recognition, $\beta = -.21$, $t(166) = -2.75$, $p = .007$; disgust emotion recognition, $\beta = -.21$, $t(166) = -2.73$, $p = .007$; and emotion recognition in total, $\beta = -.26$, $t(166) = -3.41$, $p = .001$. As the significant results of age were tangential to the research hypotheses, this variable was adjusted in subsequent analyses to avoid bias. The results in regard to gender and Chinese-contact levels will be discussed later with corresponding aims.

Table 3

Summary of Multiple Linear Regression Analyses for Variables Predicting Emotion Detection Accuracy (N = 170)

Variables	Happiness accuracy			Disgust accuracy			Total emotion detection accuracy		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.06	0.02	-.21**	-0.06	0.02	-.21**	-0.12	0.04	-.26**
Gender	-0.24	0.32	-.06	-0.30	0.31	-.07	-0.53	0.51	-.08
Chinese contact	0.01	0.02	.03	-0.00	0.01	-.02	0.00	0.02	.01
R^2		.05			.05			.07	
F for change in R^2		2.71*			2.63			4.06**	

Note. Primary: Primary Psychopathy; Secondary: Secondary Psychopathy.

*$p < .05$. **$p < .01$.

Aim 1 concerns the relationship between the Dark Triad (DT) personalities and emotion recognition ability. This was assessed through hierarchical regression models to determine whether the members of DT are significant predictors of emotion identification performance. Table 4 shows the outcomes. After age adjustment, the results revealed that primary psychopathy was a significant predictor of increased accuracy for judging disgust, $\beta = .20$, $t(164) = 2.10$, $p = .038$. Primary psychopathy was also a significant predictor of increased scores for overall emotion identification, $\beta = .22$, $t(164) = 2.27$, $p = .024$.

Table 4

Summary of Hierarchical Regression Analyses for Variables Predicting Emotion Detection Accuracy (N = 170)

Variables	Happiness accuracy			Disgust accuracy			Total emotion detection accuracy		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Step 1									
Age	-0.06	0.02	-.21**	-0.06	0.02	-.20**	-0.11	0.03	-.25**
$\triangle R^2$		.04**			.04**			.06**	
Step 2									
Age	-0.06	0.02	-.20**	-0.05	0.02	-.19*	-0.11	0.03	-.24**
Primary	0.04	0.02	.15	0.05	0.02	.20*	0.08	0.04	.22*
Secondary	0.01	0.04	.10	0.03	0.04	.06	0.04	0.07	.04
Narcissism	-0.07	0.06	-.11	-0.06	0.06	-.09	-0.13	0.09	-.12
Machiavellianism	-0.02	0.02	-.11	-0.03	0.02	-.13	-0.05	0.03	-.15
$\triangle R^2$		.02			.04			.04	

Note. Primary: Primary Psychopathy; Secondary: Secondary Psychopathy.

*p < .05. **p < .01.

3.4 Aim 2

To test hypothesis 2, namely that gender would moderate the relationship between the Dark Triad traits and emotion identification capability, we conducted a multiple regression. The multiple regression for gender was calculated first; then, the differences between females and males in judging emotions were tested. In the last step, the hierarchical regression analyses were run separately for female observers and male observers.

In the multiple regression models, the findings suggested that gender was not an important predictor of emotion recognition accuracy: happiness $\beta = -.06$, $t(166) = -0.73$, $p > .05$, disgust $\beta = -.07$, $t(166) = -0.96$, $p > .05$, total emotion recognition $\beta = -.08$, $t(166) = -1.05$, $p > .05$ (see Table 3). Further, independent sample t-tests also indicated that men did not differ markedly from women on emotion detection performance: happiness $t(168) = 0.46$, $p > .05$, $d = .08$; disgust $t(168) = 0.65$, $p > .05$, $d = .11$; overall emotion identification $t(168) = 0.68$, $p > .05$, $d = .12$ (See Table 2 for additional statistics).

After age control, the results in the hierarchical regressions indicated that for female observers, none of the DT traits significantly predicted emotion identification accuracy (see Table 5). However, for male observers (see Table 6), Machiavellianism was a major predictor of decreased accuracy for disgust emotion judgement, $\beta = -.40$, $t(36) = -2.30$, $p = .027$; and of decreased accuracy for overall emotion judgement, $\beta = -.37$, $t(36) = -2.12$, $p = .041$.

Table 5

Summary of Hierarchical Regression Analyses for Variables Predicting Emotion Detection

Accuracy in Female observers (N = 128)

Variables	Happiness accuracy			Disgust accuracy			Total emotion detection accuracy		
	B	$SE\ B$	β	B	$SE\ B$	β	B	$SE\ B$	β
Step 1									
Age	-0.07	0.03	-.19*	-0.04	0.03	-.13	-0.11	0.05	-0.20*
$\triangle R^2$		.04*			.02			.04*	
Step 2									
Age	-0.06	0.03	-.17	-0.04	0.03	-.12	-0.10	0.05	-.18*
Primary	0.05	0.03	.18	0.04	0.03	.17	0.09	0.05	.21
Secondary	-0.01	0.05	-.02	0.07	0.05	.15	0.06	0.08	.08
Narcissism	-0.02	0.07	-.02	-0.03	0.06	-.04	-0.04	0.11	-.04
Machiavellianism	-0.02	0.02	-.09	-0.01	0.02	-.07	-0.03	0.04	-.10
$\triangle R^2$		.02			.05			.04	

Note. Primary: Primary Psychopathy; Secondary: Secondary Psychopathy.

*p < .05.

Table 6

Summary of Hierarchical Regression Analyses for Variables Predicting Emotion Detection

Accuracy in Male observers (N = 42)

Variables	Happiness accuracy			Disgust accuracy			Total emotion detection accuracy		
	B	SE B	β	B	SE B	β	B	SE B	β
Step 1									
Age	-0.06	0.03	-.27	-0.07	0.03	-.34*	-0.13	0.05	-.36*
$\triangle R^2$		.07			.12*			.13*	
Step 2									
Age	-0.06	0.03	-.31	-0.11	0.03	-.50**	-0.17	0.05	-.47**
Primary	0.03	0.04	.13	0.05	0.04	.22	0.07	0.06	.20
Secondary	0.30	0.09	.53	-0.13	0.09	-.22	-0.10	0.14	-.10
Narcissism	-0.18	0.10	-.30	-0.08	0.10	-.12	-0.26	0.17	-.25
Machiavellianism	-0.05	0.04	-.23	-0.09	0.04	-.40*	-0.14	0.07	-.37*
$\triangle R^2$		.14			.22*			.21*	

Note. Primary: Primary Psychopathy; Secondary: Secondary Psychopathy.

p < .05. **p* < .01.

3.5 Aim 3

Aim 3 concerns the connection between Chinese-contact levels and the performance in the emotion detection task. On average, the exposure to Chinese population for the participants in our study was 26.05 ($SD = 9.52$). The multiple regressions exhibited that the varied levels of contact with Chinese faces did not significantly predict emotion detection performance: happiness $\beta = .03$, $t(166) = 0.45$, $p > .05$; disgust $\beta = -.02$, $t(166) = -0.27$, $p > .05$, emotion detection in total $\beta = .01$, $t(166) = 0.12$, $p > .05$.

3.6 Aim 4

The hypothesis 4 is relevant to the effects of emotional valence on differentiating emotion identification competencies. A paired samples t-test showed that emotion judgement accuracy differed dramatically between positive emotion and negative emotion, $t(169) = 7.15$, $p < .001$, $d = 0.64$. Observers were better at identifying happiness ($M = 4.91$, $SD = 1.82$) relative to disgust ($M = 3.78$, $SD = 1.73$).

Discussion

4.1 Overview

It is stated that people who are high on the Dark Triad (DT) traits may have intact or even superior cognitive empathy and Emotional Intelligence (EI) (Petrides et al., 2011; Wai & Tiliopoulos, 2012; Esperger & Bereczkei, 2012; Vonk et al., 2013). A competency that both cognitive empathy and EI emphasise is the sensitivity to emotions displayed by others (Jonason et al., 2013; Czarna et al., 2015; Miao et al., 2019). Also, people who are matched on the DT personalities may be more successful in detecting lies (Wright, Berry, & Bird, 2012). A mechanism that helps them to do so is the identification of non-verbal cues-facial expressions of emotions (Ekman & Friesen, 1969). In light of these, there may be a potential relationship between varying levels of the DT traits and emotion detection abilities. The current study assessed this relationship by using a more ecologically valid measurement (e.g. spontaneous facial expression stimuli) than previous experiments. Overall, the results presented an association between some DT traits and the heightened competencies of emotion recognition. However, the association was dependent on the emotional valence (happiness vs disgust).

4.2 Key Findings and Implications

4.2.1 Psychopathy

This study predicted that the DT traits would be associated with an advantage in emotion recognition abilities. Results partly supported this hypothesis, by showing higher overall emotion judgement accuracy correlated with higher scores in primary psychopathy. In particular, primary psychopathy was a main predictor for recognising disgust. However, there was not any compelling evidence to indicate the connection between primary psychopathy and the recognition of happiness. Although these findings align with the previous research which

advocated that non-clinical psychopathic observers are accurate at reading disgust emotions, they differ from past analyses. The current study did not discover any significant results of secondary psychopathy with emotion identification. Nonetheless, Demetrioff, Porter and Baker (2017) clarified that primary and secondary psychopathy were both associated with increased accuracy for disgust emotion identification. A possible explanation for this discrepancy is that the measurements of psychopathy are different. Demetrioff, Porter and Baker's (2017, p. 278) experiment used the Self-Report Psychopathy Scale-4 (SRP-4) (Paulhus, Neumann, & Hare, 2016) that maps onto four subscales which encompass primary and secondary psychopathy. While our study used a multidimensional LSRP scale which has two subscales (Levenson, Kiehl, & Fitzpatrick, 1995). The reliability of the secondary psychopathy scale in our study was weak (Cronbach α = .40), which possibly reduced the effects of secondary psychopathy and neutralised its connection with emotion recognition. Except the concern with measurement, the divergence in findings may also be attributed to the different characteristics between primary and secondary psychopathy. Primary psychopathy emphasises engagement in manipulative tactics and the execution of planned behaviours, whereas secondary psychopathy highlights impulsive and irresponsible behaviours (Del Gaizo & Falkenbach, 2008; Wai & Tiliopoulos, 2012; Muris et al., 2017). It seems that the manipulative nature of primary psychopathy is more closely aligned with the dark side of Emotional Intelligence (EI). That is, people who have high EI may use a manipulative strategy to manage others' emotions to favour themselves (Fix & Fix, 2015). Therefore, it is possible that primary psychopaths have better emotion recognition rather than secondary psychopaths.

As increased levels of primary psychopathic traits predicted an increased accuracy to identify emotions, there are several implications. In line with the claims of several studies (Wai

& Tiliopoulos, 2012; Petrides et al., 2011; Veselka et al., 2012), primary psychopaths may not only possess undamaged cognitive empathy and EI, but may also have superior cognitive empathy and EI. In other words, individuals with high levels of primary psychopathy appear to exhibit advantageous cognitive empathy and EI which allow them to enhance their capability to read and assess others' emotions, and subsequently utilise this sensitive information to exploit others (Esperger & Bereczkei, 2012; Nagler et al., 2014). Further, the results may indicate that high primary psychopaths are more skillful at uncovering lies which develops from their proficiency at producing lies (Wright, Berry, & Bird, 2012). Correspondingly, they possibly have some extent of expertise at identifying deceptive facial expressions of emotions. Nevertheless, primary psychopathy was the only important predictor of disgust emotion recognition in the present study. A potential bias for this is that subclinical psychopathic perceivers are prone to evaluate people negatively in general (Black, Woodworth, & Porter, 2014). This negative perception contributes to reasoning others' emotions as being more negative (e.g. disgust) than positive (e.g. happiness) (Demetrioff, Porter, & Baker, 2017). Hence, the tendency to choose negative emotions may affect emotion judgement accuracy and further affect its significant association with primary psychopathic traits.

4.2.2 Machiavellianism and Narcissism

Although the findings in our experiment indicated that individuals who scored higher in primary psychopathy had improved capability in evaluating emotions, they did not advocate that higher levels of Machiavellianism and narcissism were more accurate at reading emotions. This is consistent with the previous literature which specified that Machiavellians have poor ability to identify emotions (Wai & Tiliopoulos, 2012). It should be noted that both our study, as well as Wai and Tiliopoulos (2012) used the same self-report measurement- Mach-IV, to assess

Machiavellian tendencies. The issue with the self-report method is that participants may not be willing to rate themselves based on their true thoughts (Paulhus, Harms, Bruce, & Lysy, 2003). This results from the survey containing sensitive questions which likely cause self-presentation concerns (Krumpal, 2013). For example, Mach-IV includes questions such as "It is safest to assume that all people have a vicious streak and it will come out when they are given a chance", and "It is wise to flatter important people" (Christie & Geis, 1970). Even though we informed participants that their responses were anonymous, it is still a challenge to minimise socially desirable responding (Paulhus, 2003). As a consequence, the social desirability bias may interfere with the authentic scores of Machiavellianism and further impede its association with emotion reading abilities.

On the other hand, the findings diverge from the studies that demonstrated the superior emotion recognition abilities in narcissism (Wai & Tiliopoulos, 2012; Konrath, Corneille, Bushman, & Luminet, 2014). The divergence can be explained by various measurements of narcissism. Wai and Tiliopoulos (2012, p. 795) used a 40-item Narcissistic Personality Inventory (NPI-40) which reached a good reliability (Cronbach α = .82). Considering the experiment time and respondents' attention, we used the abbreviated version of NPI-40 (Ames, Rose, & Anderson, 2006): 16-item Narcissistic Personality Inventory (NPI-16) which had a relatively weak reliability (Cronbach α = .68). It is possible that NPI-40 is a more comprehensive measure of narcissism compared to NPI-16. Therefore, NPI-40 is more suitable and reliable at predicting the relationship between subclinical narcissists and emotion reading competencies. In terms of Konrath, Corneille, Bushman and Luminet's (2014) study, although they employed the same scale as us in their first experiment, they only tested three items from the NPI-16 which mainly comprised of the exploitativeness facet. The overall scores of the three items were significantly

associated with better emotion reading performance. However, our experiment included all 16 items. Adding up scores of 16 items might lead to the non-significant relation of narcissism with emotion identification. In general, the relationship between some DT traits (Machiavellianism and narcissism) and emotion judgement performance did not reach the significant level, which may be partially due to a lack of proper measurements to detect the association, instead of a lack of association between variables. Accordingly, it is inappropriate to deny that Machiavellianism and narcissism do not have higher cognitive empathy, EI and liar-catching abilities.

4.2.3 Gender Differences

The second hypothesis predicted that males who scored higher in the DT traits (Machiavellianism, narcissism and psychopathy) would have better competencies to detect emotions. The results did not support this position, which differs from Wai and Tiliopoulos (2012) who indicated that gender was a significant moderator between varying levels of the DT traits and overall accuracy of emotion identification. Nevertheless, caution needs to be applied as our research has large gender imbalance (*Females* = 128; *Males* = 42) which did not allow reliable inferential conclusions. Besides, we found that higher male Machiavellians were less accurate in detecting disgust and in their overall emotion judgement. The findings cannot be extrapolated to all male Machiavellians because of the small sample size (*Males* = 42). Furthermore, the motivation for making predictions about gender on emotion judgement was that men have a more robust relationship with the DT traits than women (Paulhus & Williams, 2002). Nevertheless, our data showed that women did not differ substantially from men on secondary psychopathy and narcissism. The average score of female narcissists was slightly higher than male narcissists, which is not commonly observed. These results were contrary to prior research which indicated the pronounced differences between males and females on psychopathy and

narcissism (Jonason et al., 2009; Jonason et al., 2014; Giammarco & Vernon, 2014; Grijalva et al., 2015; Jauk et al., 2016). The discrepancy can be attributed to the reduced reliability of secondary psychopathy ($\alpha = .40$) and narcissism ($\alpha = .68$), which are the likely causes of the peculiar results.

4.2.4 Chinese-Contact Levels

The third hypothesis concerned the effect of Chinese-contact levels on emotion detection abilities. The results failed to show that more experience with Chinese faces was connected with improved emotion identification. This did not conform with most of the prior literature which commented that perceivers have increased ability in decoding facial expressions when they have increased contact with the racial category to which the face belongs (Shepherd & Deregowski, 1981; Shapiro & Penrod, 1986; Rhodes et al., 1989; Anthony et al., 1992; Sporer, 2001; Meissner & Brigham, 2001; Tanaka et al., 2004). There are two reasons for this: 1) the quality of interracial contact and 2) the imbalanced sample size of participants. Firstly, a few Caucasians who have a comparative high rate of interaction with the Chinese population, they may encounter the issue that the quality of intergroup contact is not good enough (Sporer, 2001). As Walker and Hewstone (2006a) mentioned, regular contact with cross-race (CR) members seems insufficient to improve CR face memory unless the contact requires attentive and effortful encoding of CR faces. For instance, only when participants recognise CR faces individually (e.g. that face is Anna) beyond ethnically (e.g. that face is Chinese), can CR disadvantage be eliminated (Tanaka & Pierce, 2009).

Secondly, the Caucasian participants in our sample ($N = 102$) were almost twice as many as Asians ($N = 56$). On average, Caucasians had a relatively low contact level with the Chinese population. Among Asians, Chinese observers were the main group who were highly exposed to

the Chinese population. As Chinese observers ($N = 34$) only accounted for a small proportion of the participants, this may have resulted in a lack of power to identify the association between higher Chinese-contact levels and higher emotion detection abilities. Moreover, Chinese participants in this study had some unique features which may have contributed to the non-significant relationship with emotion recognition. Inspecting the background of Chinese respondents, most of them have been studying in Australia for a few months to a few years. They are different from the Chinese population who lives in China or newly arrived Chinese in Australia. For example, they may be less interactive with Chinese people, or in a more stressful status (e.g. language issues and study pressure) which limits their capacity to identify emotions. Thus, there may be additional factors which exist within Chinese participants that occupy a greater proportion of variance in emotion recognition.

4.2.5 Emotional Valence

We hypothesised that positive emotions would be more successfully detected than negative emotions. The relevant results supported the hypothesis by presenting substantially higher detection accuracy for happiness than disgust. The detection advantage for happy emotions in our study paralleled to the vast majority of previous research which includes laboratory experiments, cross-cultural studies and meta-analyses (Calder, Young, Keane, & Dean, 2000; Elfenbein & Ambady, 2002; Leppänen & Hietanen, 2003; Calvo & Lundqvist, 2008; Tottenham et al., 2009; Nelson & Russell, 2013). This may be related to the unique affective valence of happiness. That is, happiness is the only basic emotion that clearly conveys positive affect, which possibly facilitates its recognition. Another possible explanation for the superior recognition of happy emotions may be based on the frequency of occurrence theory (Somerville & Whalen, 2006; Calvo, Gutierrez-Garcia, Férnández-Martín, & Nummenmaa,

2014). The theory states that the identification accuracy of emotions is dependent on the frequency with which they occur in social settings. A prior experiment indicated that happiness was the most frequently occurring facial emotion during natural conditions in daily life, which correlated to the highest recognition accuracy over other emotions (Calvo, Gutierrez-Garcia, Férnández-Martín, & Nummenmaa, 2014).

Moreover, the mean recognition accuracy rate of emotions (happiness: 49.1%; disgust: 37.8%) in the present study is far lower than that in the study of Demetrioff, Porter and Baker (2017) (happiness: 96.59%; disgust: 66.86%). The different accuracy rates may be due to the different emotional expression stimuli. Demetrioff, Porter and Baker (2017) claimed that their assessment of emotion identification abilities was based on micro-expression tasks. Indeed, they made up static photographs from the Pictures of Facial Affect database (Ekman & Friesen, 1976) into videos to test participants. As they mentioned later, the stimuli were quick flashes of emotional expressions (Demetrioff, Porter, & Baker, 2017, p. 283). However, the emotional expression stimuli in our research were extracted from the CASMEII micro-expression database and they are spontaneous facial expressions (Yan et al., 2014). In line with the declaration of Elfenbein and Ambady (2002), more complex and dynamic stimuli (e.g. spontaneous facial expressions) are connected with lower recognition accuracy. Additionally, even though we tried our best to balance the emotion detection task between being too easy and too difficult, there is a possibility that observers felt the task too demanding to complete. In particular, the arousal level (intensity) of emotions in the micro-expression database that we used is quite subtle. As dimensional perception theory states, arousal is an important factor which affects emotion perception (Russell, 1980; Russell & Bullock, 1985). Thus, as the arousal (intensity) decreased, the recognition accuracy of emotions in our study might have been reduced.

4.2.6 Age

Even though increasing age appeared to be a significant predictor of decreased accuracy for happy, disgust and overall emotion identification, only a minority of our sample was over 25 years old ($N = 14$) so the analyses for older participants were not so reliable. Also, the distribution of age was not normal, with some extreme data points which might reverse the results. Thus, we are unable to confirm the significant relationship of aging with emotion identification deficits as other experiments did (Isaacowitz et al., 2007; Ruffman, Henry, Livingstone, & Phillips, 2008).

4.3 Limitations and Future Directions

One of the limitations in the current study was the use of psychology student sample which accounted for a large proportion of the participants. The sample is criticised for its generalisability due to the limited age range and occupation. Also, it was obvious that the psychology students constituted more females than males, which raised the gender imbalance issue. Future research should recruit a more diverse sample and balance the gender as well as age distributions to better detail their (age and gender) relations with emotion recognition. Moreover, our research was conducted at a virtual environment in Australia. People who were willing to participate in the study skewed towards a certain ethnicity: Caucasian. Even if some other races such as Chinese were involved in the sample, their quantity was not enough to investigate the race-contact hypothesis. At the same time, the minority of Chinese who have been in Australia for some time have unique profiles other than the general Chinese population. Thus, it is suggested that future experiments should be conducted in China to include more Chinese respondents and capture more accurate characteristics of the general Chinese population.

Another limitation of the study is that the measurements of DT traits were not so appropriate. Firstly, the scales of narcissism (Cronbach α = .68) and secondary psychopathy (Cronbach α = .40) were not so reliable. Secondly, Machiavellianism (Mach-IV), narcissism (NPI-16), and psychopathy (LSRP) measurements are dependent on the self-report method. Self-report assessments of sensitive topics are likely to cause socially desirable responses (Krumpal, 2013), which might underestimate the real tendency of DT personalities. Therefore, future research in this area should improve the existing measurements or create new measurements which can avoid the social desirability pressures.

Furthermore, primary psychopathy was the only significant predictor of judging disgust emotions, which might relate to the possibility that non-clinical psychopaths tend to choose negative emotions (Demetrioff, Porter, & Baker, 2017). Future analyses will need to control this bias and then interpret the results with caution. The last limitation is the difficulty of the emotion detection task. Given that the present study used the micro-expressions which were taken from the CASMEII database (Yan et al., 2014) as the emotional expression stimuli, the task might be too challenging for participants. Consequently, future research should aim to adjust the degree of difficulty in the emotion detection task. This may include increased viewing times of the emotional expression stimuli.

4.4 Conclusions

By taking into account the student sample, the measurements of DT traits and other stated limitations, the present study expands upon the research on the advantageous aspect of Dark Triad traits. The findings suggest that individuals who scored higher on primary psychopathy tended to be more accurate in detecting disgust emotions, which can be attributed to high

cognitive empathy, Emotional Intelligence, and lie detection ability. However, this study would need to be replicated before such conclusions can be made.

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Appendix A

Racial Contact Questionnaire

1	2	3	4	5	6
very strongly disagree	strongly disagree	disagree	agree	strongly agree	very strongly agree

1. I know lots of Chinese people.

2. I interact with Caucasian people during recreational periods.

3. I live, or have lived in an area where I interact with Caucasian people.

4. I live, or have lived in an area where I interact with Chinese people.

5. I interact with Chinese people during recreational periods.

6. I interact with Caucasian people on a daily basis.

7. I socialize a lot with Caucasian people.

8. I went to a high school where I interacted with Chinese students.

9. I socialize a lot with Chinese people.

10. I know lots of Caucasian people.

11. I generally only interact with Chinese people.

12. I interact with Chinese people on a daily basis.

13. I went to a high school where I interacted with Caucasian students.

14. I generally only interact with Caucasian people.

15. I have lived in an Asian country where the predominant race is Chinese.

Appendix B

Machiavellianism Inventory-Version IV (Mach-IV)

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

1. Anyone who completely trusts anyone else is asking for trouble.

2. Most people who get ahead in the world lead clean moral lives.

3. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.

4. One should take action only when sure it is morally right.

5. Generally speaking, people won't work hard unless they're forced to do so.

6. It is wise to flatter important people.

7. It is hard to get ahead without cutting corners here and there.

8. People suffering from incurable diseases should have the choice of being put painlessly to death.

9. Most people are brave.

10. The best way to handle people is to tell them what they want to hear.

11. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.

12. Honesty is the best policy in all cases.

13. Barnum was very wrong when he said there's a sucker born every minute.

14. Most people are basically good and kind.

15. When you ask someone to do something for you, it is best to give the real reasons

for wanting it rather than giving reasons which might carry more weight.

16. It is possible to be good in all respects.

17. Most people forget more easily the death of a parent than the loss of their property.

18. Never tell anyone the real reason you did something unless it is useful to do so.

19. There is no excuse for lying to someone else.

20. All in all, it is better to be humble and honest than to be important and dishonest.

Appendix C

16-item Narcissistic Personality Inventory (NPI-16)

Read each pair of statements below and place an "X" by the one that comes closest to describing your feelings and beliefs about yourself. You may feel that neither statement describes you well, but pick the one that comes closest. **Please complete all pairs**.

1. ___ I really like to be the center of attention

    ___ It makes me uncomfortable to be the center of attention

2. ___ I am no better or no worse than most people

    ___ I think I am a special person

3. ___ Everybody likes to hear my stories

    ___ Sometimes I tell good stories

4. ___ I usually get the respect that I deserve

    ___ I insist upon getting the respect that is due me

5. ___ I don't mind following orders

    ___ I like having authority over people

6.   ___   I am going to be a great person

      ___   I hope I am going to be successful

7.   ___   People sometimes believe what I tell them

      ___   I can make anybody believe anything I want them to

8.   ___   I expect a great deal from other people

      ___   I like to do things for other people

9.   ___   I like to be the center of attention

      ___   I prefer to blend in with the crowd

10.   ___   I am much like everybody else

      ___   I am an extraordinary person

11.   ___   I always know what I am doing

      ___   Sometimes I am not sure of what I am doing

12.   ___   I don't like it when I find myself manipulating people

      ___   I find it easy to manipulate people

13.   ___   Being an authority doesn't mean that much to me

      ___   People always seem to recognize my authority

14. ___ I know that I am good because everybody keeps telling me

so

___ When people compliment me I sometimes get embarrassed

15. ___ I try not to be a show off

___ I am apt to show off if I get the chance

16. ___ I am more capable than other people

___ There is a lot that I can learn from other people

Appendix D

Levenson Self-Report Psychopathy Scale (LSRP)

1	2	3	4
disagree strongly	disagree somewhat	agree somewhat	agree strongly

1. Success is based on survival of the fittest; I am not concerned about the losers.

2. For me, what's right is whatever I can get away with.

3. In today's world, I feel justified in doing anything I can get away with to succeed.

4. My main purpose in life is getting as many goodies as I can.

5. Making a lot of money is my most important goal.

6. I let others worry about higher values; my main concern is with the bottom line.

7. People who are stupid enough to get ripped off usually deserve it.

8. Looking out for myself is my top priority.

9. I tell other people what they want to hear so that they will do what I want them to do.

10. I would be upset if my success came at someone else's expense.

11. I often admire a really clever scam.

12. I make a point of trying not to hurt others in pursuit of my goals.

13. I enjoy manipulating others people's feelings.

14. I feel bad if my words or actions cause someone else to feel emotional pain.

15. Even if I were trying very hard to sell something, I wouldn't lie about it.

16. Cheating is not justified because it is unfair to others.

17. I find myself in the same kinds of trouble, time after time.

18. I am often bored.

19. I find that I am able to pursue one goal for a long time.

20. I don't plan anything very far in advance.

21. I quickly lose interest in tasks I start.

22. Most of my problems are due to the fact that other people just don't understand me.

23. Before I do anything, I carefully consider the possible consequences.

24. I have been in a lot of shouting matches with other people.

25. When I get frustrated, I often "let off steam" by blowing my top.

26. Love is overrated.

Appendix E

Example Video Clip

Appendix F

Pilot Study

Participants Number	Video Clip 1 (Happiness)	Video Clip 2 (Disgust)
1C (Chinese)	**5 times** (sluggish and despise)	3 times (neutral)
2C	**5 times** (disgust)	**5 times** (unhappy)
3C	**5 times** (sadness)	1 time (happy)
4C	**5 times** (happy smile)	3 times (tense relax)
5C	3 times (tension)	1 time (confidence)
6C	7 times (blink)	7 times (still and unmoved)
7C (Male)	8 times (still and unchanged)	**5 times** (blink)
8C (Male)	2 times (sadness)	1 time (sadness)
9NC (Non-Chinese)	**5 times** (happy)	
10NC	3 times (neutral)	
11NC	6 times (smile)	
12NC	6 times (smile)	
13NC	3 times (annoyed and angry)	4 times (confused)
14NC	3 times (down and depressed)	4 times (confused)
15NC	3 times (semi-smile)	1 time (confused)
16NC	1 time (smile)	1 time (confused)

Appendix G

Confidentiality Treaty

I agree **not to share**, **disseminate** or **reproduce** videos and images from **all content** in the research of <**Can you read her/his face?**> to any second parties.

Name

Date

Email Address

Appendix H

Ethical Approval

THE UNIVERSITY
OF ADELAIDE
AUSTRALIA

School of Psychology
University of Adelaide
North Terrace, Adelaide SA 5005
Ph. 61 8 8313 5693
Fax 61 8 8313 3770

School of Psychology: Human Research Ethics Subcommittee
Approval Sheet

Dear ..... CAROLYN

The members of the subcommittee have considered your application:

Code Number: ..... 19 / 38

Title:

INDIVIDUAL DIFFERENCES AND
RELATED EMOTION - DETECTION
ABILITY IN CROSS - RACE
CONTEXT

With [Student name, if applicable] ..... HANGWEN ZHANG

I am writing to confirm that approval has been granted for this project to proceed.
Approval is granted to 12 months from the date specified below.

Yours sincerely,

Deputy Convenor, Human Research Ethics Subcommittee

Name: ..... Paul DELFABRO

Date: ..... 30 / 4 / 19

NB Ethics committee is not
HREC but
subcommittee in school of
Psychology