The Effects of Empathy, Emotional Intelligence and Psychopathy on Interpersonal Interactions

Elise S. Owens^{a,b}, Ferguson W. H. McPharlin^b, Nathan Brooks^b and Katarina Fritzon^b

^a*Child Aware Counselling and Psychology Services, Brisbane, QLD, Australia;* ^b*Bond University, School of Psychology, Faculty of Society and Design, Gold Coast, QLD, Australia*

The current study investigated the relationships between empathy (emotional and cognitive), emotional intelligence, psychopathy, emotional contagion, and non-conscious behavioural mimicry (smiles and hand scratches), using self-report scales and a script-based interview session exhibiting nine non-verbal gestures, on a student sample. Past findings suggest a deficit of emotional but not cognitive empathy in psychopaths. Empirical research on non-conscious behavioural mimicry in psychopathy with reference to emotional intelligence is somewhat scarce; however it was proposed that individuals high in psychopathic traits would show reduced emotional mimicry based on the relation of empathy to mimicry. The study was quasi-experimental, involving individual assessment of 51 participants. Results suggest decreased emotional empathy at high levels of psychopathy and show that emotional intelligence moderates the relationship between psychopathy and non-conscious mimicry (smiles per minute). Social competence might be more predictive of effects of psychopathy on non-conscious mimicry.

Keywords: empathy; emotional contagion; emotional intelligence; mimicry; psychopathy.

Introduction

Unconscious mimicry may involve imitating vocalisations, mannerisms, posture, general bodily movements, and facial expressions (Hatfield, Bensman, Thornton, & Rapson, 2014). It is believed that mirror neurons are responsible for the ‘catching’ of others’ emotions (Rapson, Hatfield, & Le, 2009), a phenomenon referred to as emotional contagion (Arizmendi, 2011). Mirror neurons are described as a type of neuron that fires/discharges when an individual executes an action or observes the same or similar action being executed by another (Gallese, Eagle, & Migone, 2007; Iacoboni, 2009; Kilner &

Lemon, 2013). Emotional contagion specifically refers to the tendency to mimic others in social interactions (Bhullar, 2012). Mimicry can be emotional, non-emotional, automatic/non-conscious, voluntary, or a combination, for example, non-emotional automatic mimicry (Scheffer et al., 2011). Mimicry is essential to theories of empathy, social and emotional behaviour, perception, rapport, and emotional contagion (Moody & McIntosh, 2011). In its general form, mimicry is the matching of others’ behaviours (Moody & McIntosh, 2011).

According to Rapson et al. (2009), emotional contagion theory comprises three stages. The first stage is automatic mimicry

of observed behaviour/s, and the second stage, referred to as feedback, involves the forming of emotions based on the mimicked actions of the target. In other words, the second stage involves attaining through mimicry a personal sense of what the target is actually feeling (Hatfield et al., 2014; Rapson et al., 2009). The final stage is contagion: as a result of mimicry and feedback, the feeling or emotion of the target is 'caught' by the observer (Hatfield et al., 2014; Rapson et al., 2009). Such mimicry is typically non-consciously done and is referred to by Chartrand and Bargh (1999) as the chameleon effect, thus named because the effect of the mimicry is to blend into the social environment.

Like emotional contagion, the chameleon effect is characterised by a broad range of behaviours such as imitation of expressions, movements, posture, general matching, and so forth (Ashton-James & Levordashka, 2013). To say that the chameleon effect is in play, it must be clear that one individual is mimicking the other rather than environmental circumstances being the cause for a shared action (Chartrand & Bargh, 1999). The effect can also occur between two or more people simultaneously or in succession; however, to be counted as mimicry, Person A must be mimicked by Person B within a short time frame, typically a matter of seconds (Chartrand & Bargh, 1999; Chartrand & Lakin, 2013). Though limited research exists, the chameleon effect has also been indirectly linked to traits of manipulation and deceit (Habel, Kühn, Salloum, Devos, & Schneider, 2002).

Mimicry has been found to be associated with rapport (Ashton-James & Levordashka, 2013; Chartrand & Bargh, 1999; Chartrand & Lakin, 2013), and people are more likely to mimic someone with whom they are familiar (Chartrand & Bargh, 1999; Hess & Fischer, 2014). However, non-conscious mimicry has been shown to occur even between strangers (Chartrand & Bargh, 1999; van Baaren, Holland, Kawakami, & van Knippenberg, 2004). The desire to create closeness and

affiliation (rapport) where it does not already exist results in increased tendency to mimic: for example, one may find one's interaction partner attractive (gender aside) and desire to build rapport (Ashton-James & Levordashka, 2013; Chartrand & Lakin, 2013; van Leeuwen, Veling, van Baaren, & Dijksterhuis, 2009). Studies have shown that when mimicked, individuals are more helpful and generous not only to the mimicker but also to others, suggesting that it is more than mere liking but, rather, a pro-social orientation in general to which the effects of mimicry are due (van Baaren et al., 2004).

Automatic mimicry is an underlying mechanism of empathy (Scheffer et al., 2011). While mimicry and contagion require some form of empathy or desire to engage empathically, empathy in the broad sense does not require mimicry or contagion. For example, if a person was in distress and an empathic individual tried to help them, they would not be able to provide an effective assist if they were to 'catch' or mimic the distress of the first person (Hess & Fischer, 2014). Our ability to empathise can help us predict the intentions and behaviours of others and thereby facilitate smooth social interactions (Baron-Cohen & Wheelwright, 2004; Chartrand & Bargh, 1999; Jolliffe & Farrington, 2004).

A single definition for empathy is somewhat difficult, though it is often described as an understanding of others' thoughts, actions, and feelings and is rooted in imitation and instinct (Scheffer et al., 2011). Research suggests that there are three types of empathy: motor, cognitive, and affective/emotional empathy (Baron-Cohen & Wheelwright, 2004; Scheffer et al., 2011). Motor empathy simply refers to automatic/non-conscious mimicry (Khvatskaya, 2013), the definition of which was previously discussed. Cognitive empathy is that which relates to mental awareness and allows one to understand and predict the mental states of others (Aaltola, 2014; Baron-Cohen & Wheelwright, 2004; Blair, 2005). Cognitive empathy in terms of

its perspective-taking aspect is sometimes referred to or at least associated with Theory of Mind (ToM) (Baron-Cohen & Wheelwright, 2004; Schulte-Rüther, Markowitsch, Fink, & Piefke, 2007).

Emotional or affective empathy is defined as one's emotional response to others' feelings; it is essentially the care aspect of empathy (Aaltola, 2014; Baron-Cohen & Wheelwright, 2004). Affective empathy, which reduces aggression and strengthens social ties, is believed to be the essential criterion for moral agency, a notion referred to as the empathy thesis (Aaltola, 2014). According to Doherty (1997), susceptibility to emotional contagion is more related to affective than to cognitive empathy; however, both forms positively correlate with emotional contagion. Cognitive and emotional empathy are separate sides of the same coin. Although they are localised in different areas of the brain (Shamay-Tsoory, Aharon-Peretz, & Perry, 2009) and have different definitions, the two cannot be completely separated as cognitive awareness is essential to the expression of affective empathy and regulation of emotional response (Baron-Cohen & Wheelwright, 2004; Blair, 2005; Brook & Kosson, 2013).

Chartrand and Bargh (1999) explored non-conscious mimicry across a series of three studies. The authors referred to non-conscious mimicry as the chameleon effect. In the first study, the researchers asked a participant to comment on a series of photographs under the guise of creating a revised version of the Thematic Apperception Test, while a confederate posing as a second participant recited a memorised script while eliciting two specific non-verbal behaviours: face rubbing and foot shaking. The first condition involved experimental manipulation, specifically the confederate eliciting face rubbing and foot shaking. The second condition was a control where the confederate did not elicit any behaviours. Participants were found to mimic the behaviours of the confederate, demonstrating the existence of non-conscious mimicry at greater than chance levels.

In a second study, Chartrand and Bargh (1999) employed a similar methodology and examined the agreeableness rating of the participant, measuring how much they liked the other participant/confederate. The participants who had their body language mimicked by the confederate were found to like the confederate and rate the interaction as going smoothly. In the final study, the authors examined whether the chameleon effect/tendency to mimic others, was associated with a greater concern for others' feelings. The researchers employed the same methodology and added a measure of empathic tendencies. The results demonstrated that greater mimicry (foot shaking and face rubbing) by the participant was significantly related to higher levels of empathic tendencies. The research provided support for the association between unconscious mimicry and higher levels of empathy.

If the link between mimicry and empathy is accurate, then conditions in which empathy is impaired may be associated with dysfunction of the mirror neuron system (Fecteau, Pascual-Leone, & Théoret, 2008). Surprisingly little if any research has been conducted on psychopathy in relation to mimicry behaviour. This may be partially due to the majority of research on psychopathy having been conducted on incarcerated samples (Del Gaizo & Falkenbach, 2008; Mahmut, Homewood, & Stevenson, 2008) and having methodological restrictions on the ability to conduct controlled experimental research due to the custodial environment. Individuals who exhibit psychopathic traits are generally described as manipulative, impulsive, callous, calculating, deceptive, aggressive, and lacking guilt or remorse (Aaltola, 2014; Bate, Bale, Boduszek, & Dhingra, 2014; Domes, Hollerbach, Vohs, Mokros, & Habermeyer, 2013; Hare, 2003; Jones & Paulhus, 2014).

The hallmark characteristic of a psychopath is their apparent lack of or dysfunction in emotional empathy (Aaltola, 2014; Blair, 2005; Copestake, Gray, & Snowden, 2013; Fecteau et al., 2008; Patrick, 1994). Dolan

and Fullam (2004) and Blair (2005) suggest that a psychopath's deficits relate more to a lack of concern than impaired theory of mind or inability to recognise others' perspectives. While psychopaths express a deficit in emotional empathy, the cognitive aspect appears to remain intact (Chartrand & Lakin, 2013; Habel et al., 2002; Jones, Happé, Gilbert, Burnett, & Viding, 2010; Wai & Tiliopoulos, 2012). Due to their ability to manipulate, which can only be successfully achieved if an individual is able to interpret/read the emotional state of another correctly, psychopaths can appear chameleon-like or socially competent/functional (Habel et al., 2002). Some suggest higher cognitive functioning/empathy and rationality may exist in psychopaths over ordinary individuals, as they are free from emotional bias (Aaltola, 2014; Blair, 2005; Dolan & Fullam, 2004; Domes et al., 2013; Jones et al., 2010; Richell et al., 2003; Shamay-Tsoory et al., 2009). The ability of individuals with psychopathy to charm, manipulate, and deceive suggests a level of social awareness and understanding, including potential adaptive qualities. Emotional intelligence has been found to be associated with the ability to adapt to social situations and interpret the social cues of another (Goleman, 1995). Due to the ability of psychopathic people to conform to social situations and present positive impressions, it is a logical assumption to suggest that psychopathic individuals may have greater levels of emotional intelligence (Copestake et al., 2013; Dutton, 2012).

Emotional intelligence is a relatively new area of research that has been connected to psychopathy and empathy (Copestake et al., 2013; Kun, Balazs, Kapitany, Urban, & Demetrovics, 2010). The general definition provided for emotional intelligence is that it involves the ability to examine, monitor, and understand one's own feelings and emotions as well as those of others, to discriminate among feelings and to use the information to guide thinking and behaviour, and to navigate social interactions/environments effectively

(Kun et al., 2010). There are many conceptualisations of emotional intelligence, but all hold that persons high in emotional intelligence tend to be more positive, happy, and successful (Kun et al., 2010). They also tend to cope better, have better interpersonal relations, and achieve a higher academic level (Kun et al., 2010). Emotional intelligence is a mixture of abilities, traits, and skills, focusing on appraisal, expression, regulation, and utilisation of emotions in solving problems (Kun et al., 2010).

A study of emotional intelligence and psychopathy by Copestake et al. (2013) found no support for a deficit of emotional intelligence in psychopathic individuals. Other studies of a similar nature, using the assessing emotions scale, found that secondary psychopathy was negatively related to emotional intelligence but primary psychopathy showed no relation (Ali, Amorim, & Chamorro-Premuzic, 2009; Copestake et al., 2013; Grieve & Mahar, 2010). Copestake et al. (2013) suggested that some aspects of psychopathy are positively related to emotional intelligence. These findings were no surprise, as while emotional intelligence encompasses both cognitive and emotional empathy aspects, there is a stronger cognitive component in terms of using information to solve problems (Copestake et al., 2013; Kun et al., 2010), and previous studies show that psychopaths, particularly primary psychopaths, have normal or above-average cognitive abilities (Domes et al., 2013; Jones et al., 2010; Shamay-Tsoory et al., 2009).

Despite the longstanding relation between empathy and mimicry, few empirical studies have examined the relationship in terms of individual differences (Scheffer et al., 2011). The present study seeks to investigate the relationship in reference to psychopathy and emotional intelligence. The research also seeks to examine psychopathy in a non-criminal sample, examining psychopathy within the community. The study aims to examine whether relationships exist between empathy, emotional intelligence, emotional contagion,

psychopathy, and non-conscious mimicry in an adult sample. Specifically, the study aims to assess whether non-conscious mimicry is positively associated with empathic response, and negatively associated with self-reported psychopathy. An alternative hypothesis is that non-conscious mimicry is positively associated with psychopathy, in the absence of empathy. Thus the study seeks to investigate whether psychopathy and/or emotional intelligence will moderate the relationship between empathy and non-conscious mimicry.

Method

Participants

The study utilised undergraduate university students ($N = 51$) recruited through a research participation notice board offering course credit for participation. The sample ranged from 17 years to 45 years of age ($M = 20.86$, $SD = 5.54$). The sample comprised 16 males and 35 females. The highest form of completed education for the sample was found to be high school (78.4%), followed by undergraduate (13.7%), TAFE 3.9%, and postgraduate (3.9%).

Materials

Interview

The interview measured non-conscious mimicry through the expression of nine non-verbal gestures: cross arms, cross legs, lean forward, lean back, scratch hand, scratch neck, touch face, hands in lap, and smile. These behaviours were recorded using partial interval time sampling with an inter-rater reliability score of .95. The interview and corresponding scoring sheet are available from the first author by request.

Demographics

A demographics questionnaire recorded participant age, gender, and highest completed level of education.

Interpersonal Reactivity Index

The Interpersonal Reactivity Index (IRI) (Davis, 1980; 1983) is a self-report measure of empathy consisting of 28 items measured on a 5-point Likert scale, from 0 (*does not describe me well*) to 4 (*describes me very well*) (Fernández, Dufey, & Kramp, 2011). A sample item of the measures includes, 'I really get involved with the feelings of the characters in a novel' (Davis, 1980). Correlations of the IRI with other measures of empathy show that the scale has good construct validity (Davis, 1983). Internal consistency for the four subscales ranges from .71 to .77, and test-retest reliabilities range from .62 to .71 (Davis, 1983).

Self-report Psychopathy Scale III

The Self-report Psychopathy Scale III (SRP-III) consists of 64 items measured on a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*) (Paulhus, Neumann, & Hare, in press). The scale measures four facets, each with 16 items: Interpersonal Manipulation (IPM), Callous Affect (CA), Erratic Lifestyle (ELS), and Criminal Tendencies (CT), sometimes otherwise referred to as Anti-Social Behaviour (ASB). Previous studies have shown strong support for the construct validity of the SRP-III (Neumann & Pardini, 2014; Watt & Brooks, 2012; Williams & Paulhus, 2004) as well as its factor structure (Mahmut, Menictas, Stevenson, & Homewood, 2011). Alpha reliabilities from a student sample ranged from .74 to .82 for the four facets, with an overall alpha of .81 for the scale (Paulhus et al., in press). For the current sample, internal consistencies ranged from .70 to .84, with an overall alpha of .90.

Assessing Emotions Scale

The Assessing Emotions Scale (AES) (Schutte et al., 1998) is a self-report measure of emotional intelligence, comprised of 33 items, measured on a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). Kun et al. (2010) present a three-factor structure of

emotional intelligence with the labels ‘appraisal of emotions’, ‘optimism and regulation of emotions’, and ‘intrapersonal and interpersonal utilisation of emotions’. Schutte et al. (1998) indicated good internal consistency of .90 and revealed that women typically score higher on the AES than men. A student sample study revealed an alpha level of .87, with a two week test-retest reliability of .78, as well as showing support for convergent, discriminant, and predictive validity of the scale (Schutte et al., 1998). Consistent with previous studies, a more recent study by Kun et al. (2010) revealed internal consistency of the AES for all items to be .88. Cronbach’s alpha for the current sample was .91.

Emotional Contagion Scale

The Emotional Contagion Scale (ECS; Doherty, 1997) is a 15-item self-report scale assessing one’s susceptibility to ‘catching’ emotions. The ECS is measured on a Likert scale, from 1 (*never*) to 5 (*always*) and covers five facets: happiness (H), fear (F), love (L), anger (A), and sadness (S), each with three items. Comparisons with a variety of other measures have shown evidence of good construct validity (Doherty, 1997). Rueff-Lopes and Caetano (2012) found convergent validity of the ECS with the IRI and discriminant validity with the Perceived Stress Scale. Internal consistency of the scale was found to be .90 (Doherty, 1997) and .84 (Rueff-Lopes & Caetano, 2012).

Design

This quasi-experimental study involved participation in a scripted interview designed to measure mirroring behaviour, followed by completion of self-report questionnaires.

Procedure

Ethical approval was obtained from the University Research Ethics Committee. A pilot study was conducted on three students from

the University. The experiment data collection room was set up with two chairs at one end, spaced one meter apart, and slightly angled to face the video camera at the other end. Participants were greeted, invited to take a seat, and given a verbal explanation of the study. A written explanatory statement and consent form was issued to participants. Researcher A and B alternated roles as the interviewer and recorder.

Participants were told that the purpose of the interview was to ‘get to know a little about them’. Participant interviews involved asking basic interest and demographic questions based on a pre-learned script, while exhibiting predetermined non-verbal gestures. Interviews lasted 3–4 min on average.

The interview served as a measure of non-conscious mimicry in accordance with research by Ashton-James and Levordashka (2013). The interviewing researcher exhibited nine non-verbal gestures: cross arms (operationalised as any position in which the arms were touching with hands tucked or clasping the forearms, elbows, or upper arm), cross legs (knee over knee or ankle on knee was counted, while shins or feet only were not counted), lean forward (any time the back left the chair’s backrest), lean back (any time the individual’s back settled into the backrest), scratch hand (scratching or rubbing of fingers, back of hand, palm, or wrist), scratch neck (scratching or rubbing anywhere between the shoulders and the ears), touch face (any touching of the face by the hand from the chin to the hairline, including the ears), hands in lap (fingers interlocked and held in the lap or neatly folded and resting anywhere between the knees and the stomach), and smile (any time the corners of the mouth were visibly upturned, whether teeth were showing or not).

Participant gestures were recorded only if they occurred within 5 sec of the researcher exhibiting that behaviour (per Chartrand & Lakin, 2013). The total number of times that each gesture was exhibited by the interviewer

and mirrored by the participant was calculated.

Following the interview, the participants completed an online questionnaire consisting of the demographic questionnaire, IRI, ECS, AES, and SRP-III. Psychdata was used to administer the scale as a single questionnaire. Four counterbalanced versions of the online questionnaire were created, and PsychData randomly assigned one of the four versions to each participant. The researcher explained the true nature of the study upon completion of the questionnaires.

Results

Preliminary Analyses

All data were screened and analysed using the Statistics Package for the Social Sciences (SPSS) version 20. Prior to analysis, the data were examined for entry errors through visual inspection of the data file as well as initial descriptive and frequency distributions. Missing values analysis was run on the remaining sample and revealed no missing data. Total number of observations and total number of agreed observations (between researchers) were entered for the interview data, the sums of which were calculated and divided (total

agreed divided by total observed) to provide an inter-rater reliability (Reynolds & Livingston, 2012) of .95.

Following examination of descriptive statistics for the four gestures mimicked by participants, 'cross legs' and 'scratch neck' were excluded from further analysis due to the limited number of participants exhibiting either gesture. Perspective taking (cognitive) and empathic concern (emotional) subscales of the IRI were used to assess empathy. Kendall's Tau correlation was conducted for all continuous variables (Field, 2009). Table 1 shows the means, standard deviations, and Kendall's Tau correlation coefficients for the scales (predictors) and non-conscious mimicry (criterion variable; as assessed by smiles per minute and scratch hand per minute).

Preliminary analysis revealed a significant positive correlation between age and perspective taking. No other significant correlations were found for age. In relation to the empathy subscales, empathic concern showed significant positive correlations with perspective taking, emotional contagion, and emotional intelligence and a significant negative correlation with psychopathy. No significant relationship was found between empathic concern and non-conscious mimicry. Perspective taking was found to be

Table 1. Summary of intercorrelations, means, and standard deviations for the IRI, ECS, AES, SRP-III, non-conscious mimicry, and age.

Variable	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1. Age	—								20.86	5.54
2. IRI-EC	.11	—							19.41	4.16
3. IRI-PT	.23*	.27**	—						18.82	4.58
4. ECS	.08	.49***	.19	—					42.35	5.89
5. AES	.11	.20*	.28**	.24*	—				130.25	14.77
6. SRP-III	-.13	-.38***	-.13	-.32***	.01	—			142.06	27.44
7. Smile	.14	-.17	-.14	-.20*	-.20*	.02	—		0.73	0.48
8. Hand	-.00	-.06	-.08	.05	-.17	-.24*	.11	—	0.03	0.08

Note. *N* = 51. IRI = Interpersonal Reactivity Index; ECS = Emotional Contagion Scale; AES = Assessing Emotions Scale; SRP-III = Self-report Psychopathy Scale III; IRI-EC = Interpersonal Reactivity Index–Empathic Concern; IRI-PT = Interpersonal Reactivity Index–Perspective Taking.

p* < .05; *p* < .01; ****p* < .001.

positively correlated with emotional intelligence; however, no significant correlation was found for perspective taking in relation to psychopathy or non-conscious mimicry.

Results indicated that emotional contagion was significantly positively correlated with emotional intelligence and significantly negatively correlated with psychopathy. A significant negative correlation was found between emotional contagion and non-conscious mimicry (smiles) and no significant correlation to non-conscious mimicry (hand scratches). Emotional intelligence was significantly negatively correlated with non-conscious mimicry (smiles) and showed no significant relation to psychopathy or non-conscious mimicry (hand scratches). Finally, results showed no significant correlation between psychopathy and non-conscious mimicry (smiles) though a significant negative correlation was found for psychopathy with non-conscious mimicry (hand scratches).

Regression Analyses

Prior to moderation analysis, the assumptions of regression were checked. Based on past research and correlational findings from preliminary analyses, seven moderated regressions were conducted to test the hypothesis that psychopathy, emotional intelligence, and type of empathy (emotional and cognitive) would provide information about an individual's propensity to non-consciously mimic others. Hierarchical regressions were performed to assess the moderating effect of emotional intelligence on the relationship between psychopathy and non-conscious mimicry (smiles per minute), the relationship between empathy (perspective taking) and non-conscious mimicry (smiles per minute), and the relationship between empathy (empathic concern) and non-conscious mimicry (smiles per minute). Further regressions were performed to assess the moderating effect of psychopathy on the relationships between perspective taking and smiles per minute, empathic concern and smiles per

minute, perspective taking and hand scratches per minute, and empathic concern and hand scratches per minute. Significant interactions were followed up by tests of simple slopes. Significance was considered at the $p < .05$ level. Prior to entry into the respective regression equations, perspective taking, psychopathy, empathic concern, and emotional intelligence total scores were grand mean centred.

The first regression examined the moderating effect of emotional intelligence on psychopathy and non-conscious mimicry (smiles per minute). The model as a whole was significant, $R^2 = .24$, $F(3, 47) = 4.98$, $p = .004$. The first step (centred emotional intelligence and psychopathy scores) accounted for a significant 13% of variance in non-conscious mimicry (smiles), $R^2 = .13$, $F(2, 48) = 3.61$, $p = .035$. The addition of the interaction term accounted for an additional significant 11% of variance in non-conscious mimicry (smiles), $\Delta R^2 = .11$, $\Delta F(1, 47) = 6.83$, $p = .012$. Examination of main effects for each variable revealed that psychopathy was not significantly predictive of non-conscious mimicry ($\beta = .10$, $p = .450$), whereas emotional intelligence was, although it demonstrated an inverse relationship with non-conscious mimicry ($\beta = -.34$, $p = .014$), suggesting that those who had a higher level of emotional intelligence had lower levels of smiling. Results of the initial regression are presented in [Table 2](#)

Given the significant interaction term, simple slopes were examined. Critical values selected for high and low levels of the moderator (emotional intelligence) were one standard deviation above and below the mean. [Figure 1](#) presents the regression plot for non-conscious mimicry (smiles), showing a significant positive linear relationship between psychopathy and non-conscious mimicry (smiles) for participants with low levels of self-reported emotional intelligence ($\beta = .55$, $p = .013$), but a non-significant negative slope for those with high levels of emotional intelligence.

Table 2. Hierarchical multiple regression analyses predicting non-conscious mimicry (smiles) from psychopathy and emotional intelligence.

Predictor	ΔR^2	β	<i>B</i>	<i>SE B</i>	95% CI for <i>B</i>
Step 1	.13*				
Constant			0.73	0.06	[0.60, 0.86]
Psychopathy		.10	0.00	0.00	[-0.00, 0.00]
Emotional intelligence		-.34*	-0.01	0.00	[-0.02, -0.00]
Step 2	.11*				
Constant			0.72	0.06	[0.60, 0.85]
Psychopathy $\times$ Emotional intelligence		-.34*	0.00	0.00	[-0.00, 0.00]
Total R^2	.24*				

Note. $N = 51$. $\Delta R^2 = R^2$ change; β = standardised coefficient; *B* = unstandardised regression coefficient; *SE B* = standard error of the coefficient.

* $p < .05$; ** $p < .01$; *** $p < .001$.

The second regression examined the interaction effect of perspective taking (empathy) and psychopathy on non-conscious mimicry (smiles per minute). Perspective taking and psychopathy were entered at Step 1 and their interaction term at Step 2. The model as a whole did not account for a significant amount of variance in the criterion variable, $R^2 = .09$, $F(3, 47) = 1.49$, $p = .230$. There was not a statistically significant moderator effect of psychopathy as evidenced by the addition of the interaction term explaining only an additional 1.9% of the total variance,

Figure 1. The relationship between psychopathy and non-conscious mimicry as a function of emotional intelligence.

$\Delta R^2 = .02$, $\Delta F(1, 47) = 0.98$, $p = .328$. The interaction term was dropped, and the new model revealed that neither perspective taking (empathy) nor psychopathy were predictive of increased smiling mimicry ($\beta = -.24$, $p = .097$; $\beta = .08$, $p = .595$, respectively).

The third regression was conducted to examine the interaction effect of empathic concern (empathy) and psychopathy on non-conscious mimicry (smiles per minute). Empathic concern and psychopathy were entered at Step 1 and their interaction term at Step 2. The model as a whole accounted for a significant amount of variance in the criterion variable, $R^2 = .15$, $F(3, 47) = 2.86$, $p = .047$. The first step (centred empathic concern and psychopathy scores) accounted for a significant 13.2% of variance in non-conscious mimicry (smiles), $R^2 = .13$, $F(2, 48) = 3.64$, $p = .034$. There was not a statistically significant moderator effect of psychopathy, as evidenced by the addition of the interaction term explaining only an additional 2.3% of the total variance, $\Delta R^2 = .02$, $\Delta F(1, 47) = 1.26$, $p = .267$. The interaction term was dropped, and the new model revealed a statistically significant negative linear relationship between empathic concern and smiles per minute ($\beta = -.43$, $p = .013$). No significant relationship was found between psychopathy and smiles per minute ($\beta = -.15$, $p = .372$).

Table 3. Hierarchical multiple regression analyses predicting non-conscious mimicry (smiles) from perspective taking (empathy) and emotional intelligence.

Predictor	ΔR^2	β	<i>B</i>	<i>SE B</i>	95% CI for <i>B</i>
Step 1	.13*				
Constant			0.73	0.06	[0.60, 0.86]
Perspective taking		-.12	-0.01	0.02	[-0.05, 0.02]
Emotional intelligence		-.29	-0.01	0.01	[-0.02, 0.00]
Step 2	.07*				
Constant			0.68	0.07	[0.55, 0.81]
Perspective taking $\times$ Emotional intelligence		.28*	0.00	0.00	[0.00, 0.00]
Total R^2	.21*				

Note. *N* = 51. $\Delta R^2 = R^2$ change; β = standardised coefficient; *B* = unstandardised regression coefficient; *SE B* = standard error of the coefficient.
p* < .05; *p* < .01; ****p* < .001.

The fourth regression examined the moderating effect of emotional intelligence on perspective taking (empathy) and non-conscious mimicry (smiles per minute). The overall model was significant, $R^2 = .21$, $F(3, 47) = 4.04$, $p = .012$. The first step (centred emotional intelligence and perspective-taking scores) accounted for a significant 13% of variance in non-conscious mimicry (smiles), $R^2 = .13$, $F(2, 48) = 3.68$, $p = .033$. The addition of the interaction term accounted for a significant 7.2% of additional variance in non-conscious mimicry (smiles), $\Delta R^2 = .07$, $\Delta F(1, 47) = 4.27$, $p = .044$. Examination of main effects revealed that alone neither perspective taking nor emotional intelligence were significant predictors of non-conscious mimicry ($\beta = -.12$, $p = .406$; $\beta = -.29$, $p = .054$, respectively). Results of the initial regression are presented in Table 3.

As the interaction term was significant, simple slopes were examined. Critical values selected for high and low levels of the moderator (emotional intelligence) were one standard deviation above and below the mean. Figure 2 presents the regression plot for non-conscious mimicry smiles, showing a positive, albeit non-significant, relationship between perspective taking and non-conscious mimicry (smiles) for participants with high levels of self-reported emotional

Figure 2. The relationship between perspective taking (empathy) and non-conscious mimicry (smiles) as a function of emotional intelligence.

intelligence ($\beta = .15$, $p = .438$). A non-significant negative slope was revealed for those with low levels of emotional intelligence ($\beta = -.326$, $p = .067$).

A further regression was conducted examining the moderating effect of emotional intelligence on empathic concern (empathy) and non-conscious mimicry (smiles per minute). Following the initial regression, two new centred interaction terms were created between empathic concern and emotional

Table 4. Hierarchical multiple regression analyses predicting non-conscious mimicry (smiles) from empathic concern (empathy) and emotional intelligence.

Predictor	ΔR^2	β	<i>B</i>	<i>SE B</i>	95% CI for <i>B</i>
Step 1	.18**				
Constant			0.73	0.06	[0.60, 0.85]
Empathic concern		-.26	-0.03	0.02	[-0.06, 0.00]
Emotional intelligence		-.27	-0.01	0.00	[-0.02, 0.00]
Step 2	.08*				
Constant			0.68	0.06	[0.56, 0.81]
Empathic concern $\times$ Emotional intelligence		.29*	0.00	0.00	[0.00, 0.01]
Total R^2	.26*				

Note. $N = 51$. $\Delta R^2 = R^2$ change; β = standardised coefficient; *B* = unstandardised regression coefficient; *SE B* = standard error of the coefficient.

* $p < .05$; ** $p < .01$; *** $p < .001$.

intelligence (one for low and one for high emotional intelligence). Results of the initial regression are presented in Table 4.

The overall model was significant, $R^2 = .26$, $F(3, 47) = 5.58$, $p = .002$. The first step (centred empathic concern and emotional intelligence scores) accounted for a significant 18.2% of variance in non-conscious mimicry (smiles), $R^2 = .18$, $F(2, 48) = 5.32$, $p = .008$. The addition of the interaction term accounted for a significant additional 8.1% of variance in non-conscious mimicry (smiles), $\Delta R^2 = .08$, $\Delta F(1, 47) = 5.17$, $p = .028$. Examination of the main effects revealed that alone neither empathic concern nor emotional intelligence were significant predictors of non-conscious mimicry (smiles: $\beta = -.26$, $p = .064$; $\beta = -.27$, $p = .058$, respectively).

As the interaction term was significant, simple slopes were examined. Figure 3 presents the regression plot for non-conscious mimicry (smiles), showing a significant negative relationship between empathic concern and non-conscious mimicry (smiles) for participants with low levels of self-reported emotional intelligence ($\beta = -.57$, $p = .004$). A non-significant positive slope was revealed for those with high levels of emotional intelligence ($\beta = .04$, $p = .845$).

The sixth regression tested the interaction effect of perspective taking (empathy) and

Figure 3. The relationship between empathic concern (empathy) and non-conscious mimicry (smiles) as a function of emotional intelligence.

psychopathy on non-conscious mimicry (hand scratches per minute). Perspective taking and psychopathy were entered at Step 1 and their interaction term at Step 2. The model as a whole did not account for a significant amount of variance in the criterion variable, $R^2 = .11$, $F(3, 47) = 2.00$, $p = .126$. There was not a statistically significant moderator effect of psychopathy, as evidenced by the addition of the interaction term explaining only an additional 1.4% of the total variance, $\Delta R^2 = .01$, $\Delta F(1, 47) = 0.73$, $p = .398$. The interaction term was dropped and the new model revealed that perspective taking

empathy was not predictive of increased hand scratching mimicry ($\beta = -.17, p = .226$). A statistically significant negative linear relationship ($\beta = -.29, p = .040$) was found however between psychopathy and hand scratching mimicry.

The final regression tested the interaction effect of empathic concern (empathy) and psychopathy on non-conscious mimicry (hand scratches per minute). Empathic concern and psychopathy were entered at Step 1 and their interaction term at Step 2. The model as a whole accounted for a significant amount of variance in the criterion variable, $R^2 = .18, F(3, 47) = 3.38, p = .026$. The first step (centred empathic concern and psychopathy scores) accounted for a significant 14.7% of variance in non-conscious mimicry (hand scratches), $R^2 = .15, F(2, 48) = 4.15, p = .022$. There was not a statistically significant moderator effect of psychopathy, as evidenced by the addition of the interaction term explaining only an additional 3% of the total variance, $\Delta R^2 = .03, \Delta F(1, 47) = 1.73, p = .195$. The interaction term was excluded, and the new model revealed statistically significant negative linear relationships for both empathic concern (empathy) and psychopathy with hand scratching mimicry ($\beta = -.35, p = .044$; $\beta = -.48, p = .006$, respectively).

Discussion

The purpose of the study was to assess the effects of several personality and individual difference variables on non-conscious mimicry, as explained by the perception-behaviour link, as well as attempting to define more clearly the difference between behavioural non-conscious mimicry and emotional contagion. Davis (1983) and Chartrand and Bargh (1999) indicate that empathy, in particular perspective taking, has a positive relationship with non-conscious mimicry; however, the current study found no significant relationship between perspective taking and either measure of non-conscious mimicry.

In reference to hand scratches per minute and emotional intelligence, no significant relationship was found; however, a significant negative relationship was found between emotional intelligence and smiles per minute, indicating that as self-reported levels of emotional intelligence increased, participants' tendency to mimic, in the form of smiling, decreased. Non-conscious mimicry (hand scratches per minute) showed no significant correlation to self-reported emotional contagion, providing some support regarding discriminant validity for hand scratching as a purely behavioural measure, unrelated to emotion. Non-conscious mimicry (smiles per minute), however, was unexpectedly significantly negatively correlated with emotional contagion, indicating that individuals scoring lower on self-report emotional contagion mimicked smiling more, though if accounting for Type 1 error by reducing the alpha coefficient to $p < .01$, the relationship was no longer significant.

As predicted, based on findings by Ali et al. (2009), results indicated a significant negative correlation between psychopathy and self-reported emotional empathy as measured by empathic concern, thus supporting the idea of a deficit of emotional empathy in psychopathy (Blair, 2005; Fecteau et al., 2008). Likewise, the non-significant relationship found between psychopathy and cognitive empathy (PT) was in line with findings of past studies that suggest no deficit of cognitive empathy (Habel et al., 2002; Wai & Tiliopoulos, 2012). Psychopathy was also significantly negatively related to non-conscious mimicry (hand scratches per minute), indicating that as participants' level of self-reported psychopathy increased, their tendency to engage in non-conscious behavioural mimicry decreased. No significant relationship was found between psychopathy and smiling.

Emotional intelligence was found to be a significant moderator of the relationship between psychopathy and non-conscious mimicry (smiles), such that there was a significant positive linear relationship between

psychopathy and non-conscious mimicry (smiles) for participants at low levels of self-reported emotional intelligence. This finding may reflect the tendency of individuals with higher levels of psychopathic traits to engage in a superficial and charming manner, rather than having a genuine connection with another person (Hare, 1996; 2003).

Emotional intelligence was also shown to moderate the relationship between perspective taking (empathy) and mimicry (smiles). Results of simple slopes indicated that the moderating effect at high and low levels was not significantly different from zero. Psychopathy did not alter the relationship (in terms of moderation) between empathy (perspective taking) and non-conscious mimicry (hand scratching).

In the current study there were several unexpected findings, particularly regarding the relationship of non-conscious mimicry, as measured by smiles per minute, to emotional intelligence and emotional contagion. Both emotional contagion and emotional intelligence were negatively related to non-conscious mimicry (smiling), which, given their empathic qualities (Kun et al., 2010; Rapson et al., 2009), was surprising. The direction of the moderating effect (in terms of simple slopes) of emotional intelligence on psychopathy and non-conscious mimicry (smiling) was also unexpected. The negative relation between psychopathy and non-conscious mimicry (hand scratches) was expected, given that non-conscious mimicry has been shown to be positively correlated with empathy (Chartrand & Bargh, 1999) and psychopathy is related to a dysfunction in empathy (Ali et al., 2009) and therefore predicted to express a dysfunction in mimicry (Fecteau et al., 2008).

There are several possible explanations as to these findings but further research outside the scope of the current study is required. First, there is an issue with smiling as a measure of behavioural mimicry. Smiling, in the current study, was considered a measure of behavioural mimicry due to research by

Chartrand and Bargh (1999) and Gump and Kulik (1997), suggesting that smiles and facial expressions in general can be measures of behavioural rather than emotional mimicry, in terms of facial muscle movements. Moody and McIntosh (2011) also suggested that mimicry to facial movements is rapid and therefore happens regardless of emotion. Smiles can express strong emotions or simply be behavioural reactions; however, mimicry depends on how a smile is interpreted by the observer (Hess & Fischer, 2014), suggesting for the study that regardless of intent to present smiles as emotion-free behaviours, they may have been interpreted otherwise.

Another possibility is that if individuals were high in emotional intelligence, they may have perceived that the smiles from the researcher were scripted rather than genuine, and therefore participant effects may have been at work. Rigorous interview training may well remedy this (Ashton-James & Levordashka, 2013). This may also have been the case given that a fair portion of the sample population were either studying on an undergraduate program in psychology or had some knowledge of psychology research in general. Although not examined in the current study, liking and/or mood of both the researcher and participant may have had an effect on the results, particularly in relation to smiling, as people mimic smiles more when they like someone (McIntosh, Reichmann–Decker, Winkelman, & Wilbarger, 2006) – yet another reason to exclude smiling from future studies examining behavioural mimicry. There is also the possibility that another variable not considered had an impact on the results relating to emotional intelligence, as the field of study surrounding the topic is relatively new (Copestake et al., 2013; Kun et al., 2010); thus, future research should look more closely at the effects of emotional intelligence.

Limitations and Future Research

There are limitations to the present study as well as potential directions for future research

that should be considered. The major limitation of the current study was lack of power. A priori G^* power calculations indicated a required participant pool of roughly 80. Given the nature of the experiment, in terms of interview and session length, the required number of participants was not met, and thus power was reduced. Considering this and the number of variables included in the study, potential risk of Type 1 and Type 2 error was increased (Field, 2009). In relation to the analyses conducted, it is recognised that non-parametric analyses are not usually followed up by regression analyses; however, violations to the normality assumptions, concerning preliminary analyses, were minor, and regression is considered robust to violations of normality (Field, 2009).

An issue of particular note was the lack of mimicry expressed for the majority of non-verbal gestures exhibited in the interview. Smiling and hand scratching were the only gestures appearing to occur at greater than chance levels; even so, hand scratching was severely limited; therefore all analyses pertaining to hand scratching should be carefully considered in light of this fact. Hess and Fischer (2014) suggest that smiles are generally mimicked more than are other actions, toward friends and strangers alike, because of their limited social cost. Another explanation is that while facial expressions are rapid, movements of the body are more delayed (Moody & McIntosh, 2011); therefore the 5-sec window for mimicry may not be enough to capture mimicry of body movement. According to Moody and McIntosh (2011), facial expressions receive greater attention by interaction partners and are more difficult to ignore. This is a particularly valid explanation as to the lack of bodily mimicry, given that at the conclusion of the study numerous participants expressed being unaware and had not particularly noticed the mannerisms being conducted by the researcher. Only after gaining knowledge of the true nature of the study did participants realise they had mimicked during the interview, which provides support

for validity of the interview as a measure of non-conscious mimicry (Chartrand & Bargh, 1999).

With respect to the finding of limited mimicry for bodily movements, particularly where hand scratches were concerned, another limitation is presented. The lack of mimicry could be explained by excess noise in the experiment. It was proved difficult, despite best efforts, to refrain completely from non-scripted behaviours, which may have produced experimenter effects (Ashton-James & Levordashka, 2013). More importantly, the expression of nine non-verbal gestures in such a short period was a limitation. Future research using interaction measures of non-conscious behavioural mimicry should consider an extended interview training pilot period prior to conducting research (Ashton-James & Levordashka, 2013). Future studies should further examine bodily gestures to determine which are most often mimicked (Chartrand & Lakin, 2013), present fewer gestures at a higher frequency, and examine fewer variables overall. Alternatively, it may be of benefit to also examine a wide range of not only body movement but also facial expression, to more clearly define/separate behavioural from emotional mimicry (Moody & McIntosh, 2011). Future research should also consider the use of a baseline or control group, as this would help better determine whether or not mimicry occurred simply by chance (Chartrand & Bargh, 1999).

While the use of a university sample has the advantage of being relatively free of clinical disorders such as ASD and APD, use of a community sample would improve generalisability and, in relation to emotional deficits in psychopathy, provide greater understanding of the relationship (Ali et al., 2009). If examining student samples in the future, it may be more beneficial to look at Machiavellianism or narcissism, as these members of the dark triad are potentially more likely than psychopathy to produce significant results in a student sample (Ashton-James & Levordashka, 2013). In future studies, if examining the relationship of

the current variables in a community sample, ASD and other overlapping disorders should be screened for (Ashton-James & Levordashka, 2013).

As always with self-report measures, there is the risk of socially desirable responding; however, participants were asked to answer as honestly as possible given that others would not be able to link them to their data. A limitation of the current study was the potential for fatigue effects, not only on participants but also researchers. Fatigue on the part of researchers may have affected mood and therefore how interviews were conducted on some days. Given the limited time and need to fit in with others' schedules, this was unavoidable. Future research should further standardise such studies and provide a more relaxed setting for interviews, as this would provide a less clinical feeling and may prompt increased mimicry.

Copestake et al. (2013) suggests that emotional intelligence is important for social functioning and alludes to a connection to psychopathy; however, given the clearer relation of cognitive empathy to social competence and social competence to the mirror neuron system, it may be better for future studies to examine social competence in relation to psychopathy and non-conscious mimicry. Based on literature searches, adult scales for social competence appear to be lacking; this also should be remedied. In relation to psychopathy, future studies should examine individual subscales rather than a global scale to improve interpretability of results and better explain the relationship of psychopathy to empathy and non-conscious mimicry (Bate et al., 2014; Copestake et al., 2013).

Conclusion

The current study made some methodological improvements and shed light on yet to be corrected methodological and design flaws. The use of a student sample in examining psychopathy rather than a prison or clinical sample improved to a degree the generalisability

of results. However, this was still limited given that a student sample is also not a true representation of the general population. Use of the student sample acted as a control against potential effects of overlapping personality and clinical disorders with psychopathy as such disorders are less prevalent in student samples (Ali et al., 2009). The current study also controlled for the effects of rapport, on tendency to mimic, by ensuring the interviewer was not familiar with the participant (Chartrand & Bargh, 1999).

Unlike past research, the current study examined both cognitive and emotional empathy, in relation to mimicry, in an attempt to provide a clearer picture of the relationship. A form of emotional contagion included in the study not only acted as a validity check for the interview, measuring non-conscious behavioural mimicry, but also provided clearer insight into the differences between emotional contagion and behavioural mimicry and pointed out issues concerning the use of smiling as a measure for mimicry. Use of a dynamic measure of mimicry rather than static images was also an improvement on past studies, as this provides a more accurate and natural indication of non-conscious behavioural mimicry as well as improving ecological validity (Moody & McIntosh, 2011). The current study also revealed several areas of import for future research, specifically further research to explain the effects of emotional intelligence and future research to examine the impact of social competence.

Disclosure statement

No potential conflict of interest was reported by the author.

References

- Aaltola, E. (2014). Affective empathy as core moral agency: Psychopathy, autism and reason revisited. *Philosophical Explorations*, 17, 76–92. doi:10.1080/13869795.2013.825004
- Ali, F., Amorim, I. S., & Chamorro-Premuzic, T. (2009). Empathy deficits and trait emotional

- intelligence in psychopathy and Machiavellianism. *Personality and Individual Differences*, 47, 758–762. doi:10.1016/j.paid.2009.06.016
- Arizmendi, T. G. (2011). Linking mechanisms: Emotional contagion, empathy, and imagery. *Psychoanalytic Psychology*, 28, 405–419. doi:10.1037/a0024176
- Ashton-James, C. E., & Levordashka, A. (2013). When the wolf wears sheep's clothing: Individual differences in the desire to be liked influence nonconscious behavioral mimicry. *Social Psychological and Personality Science*, 4, 643–648. doi:10.1177/1948550613476097
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34, 163–175. doi:10.1023/B:JADD.0000022607.19833.00
- Bate, C., Bale, C., Boduszek, D., & Dhirga, K. (2014). Psychopathy, intelligence and emotional responding in a non-forensic sample: An experimental investigation. *The Journal of Forensic Psychiatry and Psychology*, 25, 600–612. doi:10.1080/14789949.2014.943798
- Bhullar, N. (2012). Relationship between mood and susceptibility to emotional contagion: Is positive mood more contagious? *North American Journal of Psychology*, 14, 517.
- Blair, R. (2005). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition*, 14, 698–718. doi:10.1016/j.concog.2005.06.004
- Brook, M., & Kosson, D. S. (2013). Impaired cognitive empathy in criminal psychopathy: Evidence from a laboratory measure of empathic accuracy. *Journal of Abnormal Psychology*, 122, 156–166. doi:10.1037/a0030261
- Chartrand, T. L., & Bargh, J. A. (1999). The Chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*, 76, 893–910. doi:10.1037/0022-3514.76.6.893
- Chartrand, T. L., & Lakin, J. L. (2013). The antecedents and consequences of human behavioral mimicry. *Annual Review of Psychology*, 64, 285–308. doi:10.1146/annurev-psych-113011-143754
- Copestake, S., Gray, N. S., & Snowden, R. J. (2013). Emotional intelligence and psychopathy: A comparison of trait and ability measures. *Emotion (Washington, D.C.)*, 13, 691–702. doi:10.1037/a0031746
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *Catalog of Selected Documents in Psychology*, 10, 85. Retrieved from www.eckerd.edu/academics/psychology/files/Davis_1980.pdf
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113–126. doi:10.1037/0022-3514.44.1.113
- Del Gaizo, A. L., & Falkenbach, D. M. (2008). Primary and secondary psychopathic traits and their relationship to perception and experience of emotion. *Personality and Individual Differences*, 45, 206–212. doi:10.1016/j.paid.2008.03.019
- Doherty, R. W. (1997). The emotional contagion scale: A measure of individual differences. *Journal of Nonverbal Behavior*, 21, 131–154. doi:10.1023/A:1024956003661
- Dolan, M., & Fullam, R. (2004). Theory of mind and mentalizing ability in antisocial personality disorders with and without psychopathy. *Psychological Medicine*, 34, 1093–1102. doi:10.1017/S0033291704002028
- Domes, G., Hollerbach, P., Vohs, K., Mokros, A., & Habermeyer, E. (2013). Emotional empathy and psychopathy in offenders: An experimental study. *Journal of Personality Disorders*, 27, 67–84. doi:10.1521/pedi.2013.27.1.67
- Dutton, K. (2012). *The Wisdom of psychopaths: What saints, spies, and serial killers can teach us about success*. New York: Scientific American.
- Fecteau, S., Pascual-Leone, A., & Théoret, H. (2008). Psychopathy and the mirror neuron system: Preliminary findings from a non-psychiatric sample. *Psychiatry Research*, 160, 137–144. doi:10.1016/j.psychres.2007.08.022
- Fernández, A. M., Dufey, M., & Kramp, U. (2011). Testing the psychometric properties of the Interpersonal Reactivity Index (IRI) in Chile: Empathy in a different cultural context. *European Journal of Psychological Assessment*, 27, 179–185. doi:10.1027/1015-5759/a000065
- Field, A. P. (2009). *Discovering statistics using SPSS*. London: SAGE.
- Gallese, V., Eagle, M. N., & Migone, P. (2007). Intentional attunement: Mirror neurons and the neural underpinnings of interpersonal relations. *Journal of the American Psychoanalytic Association*, 55, 131–175. doi:10.1177/00030651060540011101
- Goleman, D. (1995). *Emotional intelligence*. London: Bloomsbury.
- Grieve, R., & Mahar, D. (2010). The emotional manipulation–psychopathy nexus: Relationships with emotional intelligence, alexithymia and ethical position. *Personality and Individual Differences*, 48, 945–950. doi:10.1016/j.paid.2010.02.028

- Gump, B. B., & Kulik, J. A. (1997). Stress, affiliation, and emotional contagion. *Journal of Personality and Social Psychology*, 72, 305–319. doi:10.1037/0022-3514.72.2.305
- Habel, U., Kühn, E., Salloum, J. B., Devos, H., & Schneider, F. (2002). Emotional processing in psychopathic personality. *Aggressive Behavior*, 28, 394–400. doi:10.1002/ab.80015
- Hare, R. D. (1996). Psychopathy: A clinical construct whose time has come. *Criminal Justice and Behavior*, 23, 25–54. doi:10.1177/0093854896023001004
- Hare, R. D. (2003). *The Hare psychopathy checklist – revised* (2nd ed.). Toronto: Multi-Health Systems.
- Hatfield, E., Bensman, L., Thornton, P. D., & Rapson, R. L. (2014). New perspectives on emotional contagion: A review of classic and recent research on facial mimicry and contagion. *Interpersona: An International Journal on Personal Relationships*, 8, 159–179. doi:10.5964/ijpr.v8i2.162
- Hess, U., & Fischer, A. (2014). Emotional mimicry: Why and when we mimic emotions. *Social and Personality Psychology Compass*, 8, 45–57. doi:10.1111/spc3.12083
- Iacoboni, M. (2009). Imitation, empathy, and mirror neurons. *Annual Review of Psychology*, 60, 653–670. doi:10.1146/annurev.psych.60.110707.163604
- Jolliffe, D., & Farrington, D. P. (2004). Empathy and offending: A systematic review and meta-analysis. *Aggression and Violent Behavior*, 9, 441–476. doi:10.1016/j.avb.2003.03.001
- Jones, A. P., Happé, F., Gilbert, F., Burnett, S., & Viding, E. (2010). Feeling, caring, knowing: Different types of empathy deficit in boys with psychopathic tendencies and autism spectrum disorder. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 51, 1188–1197. doi:10.1111/j.1469-7610.2010.02280.x
- Jones, D. N., & Paulhus, D. L. (2014). Introducing the Short Dark Triad (SD3): A brief measure of dark personality traits. *Assessment*, 21, 28–41. doi:10.1177/1073191113514105
- Khvatskaya, Y. (2013). *Which empathy do individuals with psychopathic traits lack?* (Dissertation/Thesis), ProQuest, UMI Dissertations Publishing. State University of New York at Binghamton.
- Kilner, J. M., & Lemon, R. N. (2013). What we know currently about mirror neurons. *Current Biology: CB*, 23, R1057–R1062. doi:10.1016/j.cub.2013.10.051
- Kun, B., Balazs, H., Kapitany, M., Urban, R., & Demetrovics, Z. (2010). Confirmation of the three-factor model of the Assessing Emotions Scale (AES): Verification of the theoretical starting point. *Behavior Research Methods*, 42, 596–606. doi:10.3758/BRM.42.2.596
- Mahmut, M. K., Homewood, J., & Stevenson, R. J. (2008). The characteristics of non-criminals with high psychopathy traits: Are they similar to criminal psychopaths? *Journal of Research in Personality*, 42, 679–692. doi:10.1016/j.jrp.2007.09.002
- Mahmut, M. K., Menictas, C., Stevenson, R. J., & Homewood, J. (2011). Validating the factor structure of the Self-Report Psychopathy scale in a community sample. *Psychological Assessment*, 23, 670–678. doi:10.1037/a0023090
- McIntosh, D. N., Reichmann–Decker, A., Winkelman, P., & Wilbarger, J. L. (2006). When the social mirror breaks: Deficits in automatic, but not voluntary, mimicry of emotional facial expressions in autism. *Developmental Science*, 9, 295–302. doi:10.1111/j.1467-7687.2006.00492.x
- Moody, E. J., & McIntosh, D. N. (2011). Mimicry of dynamic emotional and motor-only stimuli. *Social Psychological and Personality Science*, 2, 679–686. doi:10.1177/1948550611406741
- Neumann, C. S., & Pardini, D. (2014). Factor structure and construct validity of the Self-Report Psychopathy (SRP) scale and the Youth Psychopathic Traits Inventory (YPI) in young men. *Journal of Personality Disorders*, 28, 419–433. doi:10.1521/pedi.2012.26_063
- Patrick, C. J. (1994). Emotion and psychopathy: Startling new insights. *Psychophysiology*, 31, 319–330. doi:10.1111/j.1469-8986.1994.tb02440.x
- Paulhus, D. L., Neumann, C. S., & Hare, R. D. (in press). *Manual for the Self-Report Psychopathy scale*. Toronto: Multi-Health Systems.
- Rapson, R. L., Hatfield, E., & Le, Y.-C. L. (2009). *Emotional contagion and empathy*. The MIT Press.
- Reynolds, C. R., & Livingston, R. B. (2012). *Mastering modern psychological testing: Theory & methods*. Boston: Pearson.
- Richell, R. A., Mitchell, D. G. V., Newman, C., Leonard, A., Baron-Cohen, S., & Blair, R. J. R. (2003). Theory of mind and psychopathy: Can psychopathic individuals read the ‘language of the eyes’? *Neuropsychologia*, 41, 523–526. doi:10.1016/S0028-3932(02)00175-6
- Rueff-Lopes, R., & Caetano, A. (2012). The emotional contagion scale: Factor structure and psychometric properties in a Portuguese sample. *Psychological Reports*, 111, 898. doi:10.2466/08.21.28.PR0.111.6.898-904
- Scheffer, I., Wilson, S., & Baird, A. (2011). Mirror neuron system involvement in empathy: A critical look at the evidence. *Social*

- Neuroscience*, 6, 327–335. doi:10.1080/17470919.2010.547085
- Schulte-Rüther, M., Markowitsch, H. J., Fink, G. R., & Piefke, M. (2007). Mirror neuron and theory of mind mechanisms involved in face-to-face interactions: A functional magnetic resonance imaging approach to empathy. *Journal of Cognitive Neuroscience*, 19, 1354–1372. doi:10.1162/jocn.2007.19.8.1354
- Schutte, N. S., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences*, 25, 167–177. doi:10.1016/S0191-8869(98)00001-4
- Shamay-Tsoory, S. G., Aharon-Peretz, J., & Perry, D. (2009). Two systems for empathy: A double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions. *Brain*, 132, 617–627. doi:10.1093/brain/awn279
- van Baaren, R. B., Holland, R. W., Kawakami, K., & van Knippenberg, A. (2004). Mimicry and prosocial behavior. *Psychological Science*, 15, 71–74. doi:10.1111/j.0963-7214.2004.01501012.x
- van Leeuwen, M. L., Veling, H., van Baaren, R. B., & Dijksterhuis, A. (2009). The influence of facial attractiveness on imitation. *Journal of Experimental Social Psychology*, 45, 1295–1298. doi:10.1016/j.jesp.2009.07.008
- Wai, M., & Tiliopoulos, N. (2012). The affective and cognitive empathic nature of the dark triad of personality. *Personality and Individual Differences*, 52, 794–799. doi:10.1016/j.paid.2012.01.008
- Watt, B., & Brooks, N. (2012). Self-report psychopathy in an Australian community sample. *Psychiatry, Psychology and Law*, 19, 389–313. doi:10.1080/13218719.2011.585130
- Williams, K. M., & Paulhus, D. L. (2004). Factor structure of the Self-Report Psychopathy scale (SRP-II) in non-forensic samples. *Personality and Individual Differences*, 37, 765–778. doi:10.1016/j.paid.2003.11.004