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Establishing the reliability and validity of three questionnaire measures of empathy in a sample of University of Cape Town students

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Abstract

Empathy is a difficult construct to measure. In South Africa, there have only been few studies which have investigated dispositional empathy (i.e., cognitive and affective empathy). Although utilising internationally psychometrically sound measures allows for comparison across contexts, the psychometric properties of questionnaire measures of empathy have not yet been validated in South Africa's multicultural and multilingual context. This study attempts to investigate the psychometric properties of three questionnaire measures of empathy, namely the Questionnaire of Cognitive and Affective Empathy (QCAE), the Interpersonal Reactivity Index (IRI), and the Toronto Empathy Questionnaire (TEQ). The questionnaire measures were administered to 376 male and female university students from a South African university. Statistical analysis was employed for reliability and correlation analysis as well as for exploratory factor analysis using principal component analysis to compare the present studies results to those found in the literature. Reliability analysis revealed satisfactory internal consistency across all the questionnaires. Convergent validity was established across all three questionnaires and discriminant validity was established between the QCAE's *Online Simulation* and *Perspective-Taking* subscales, with the IRI's *Personal Distress* subscale. Principal component analysis revealed that only the IRI was consistent with findings in the literature, while the QCAE produced contradictory results. Lastly, female participants out-performed male participants in overall, cognitive and affective empathy. Future research should investigate the theoretical and empirical shortcomings of problematic items. Furthermore, more research should be done to establish the multidimensional nature of empathy and utility of questionnaires in accounting for the aforesaid shortcomings.

Establishing the reliability and validity of three questionnaire measures of empathy in a sample of University of Cape Town students

It is essential that we use psychometrically sound (i.e., reliable and valid) measures when conducting research. Researchers often turn to employing measures that have previously demonstrated good psychometric properties, as developing a new measure is time-consuming (Foxcroft, 2004). Employing these previously-developed measures has the added advantage of allowing for comparisons of findings across national and international studies. In South Africa, many of the measures we employ have been developed outside of our context, for these two reasons. However, it is important to bear in mind the significance of context – what is applicable in one context may well not be applicable in another. It is therefore important to assess whether the measures we utilise are in fact performing well (i.e., are psychometrically sound) in our multicultural and multi-lingual South African context before we use them in our research studies (Foxcroft, 2004).

A research question of particular importance is that of the correlates of aggressive and antisocial behaviour in society, given the occurrence of aggressive, violent, and criminal behaviour in various contexts world-wide (e.g., Gantiva et al., 2018; Sest & March, 2017; Tseloni et al., 2010; Vachon et al., 2014; Waller et al., 2018). In South Africa, this research question holds significant practical value considering that South Africa has one of the highest rates of these behaviours in the world (Foster, 2012; Kang'ethe et al., 2016; Matthews et al., 2019; Sommer et al., 2017; Statistics South Africa, 2019). Once predictors of such behaviours are established, appropriate interventions can be developed in an attempt to reduce these behaviours (Menesini & Salmivalli, 2017).

Substantial international investigations have demonstrated a relationship between

empathy (and the lack thereof) and aggressive and antisocial behaviour (e.g., Gantiva et al., 2018; Sest & March., 2017; Van Hazebroek et al., 2017; Waller et al., 2018). While aggressive behaviour is a concern worldwide, it is particularly problematic in South Africa - observed in the high rates of crime and violence (Sommer et al., 2017; Statistics South Africa, 2019). To date, South African studies have used empathy measures very sparsely, reporting questionable reliability, with only two studies investigating this topic (i.e., Malcolm-Smith et al. 2015 and Pileggi, 2018). What has become apparent in these two South African studies is that there is a need to identify measures of empathy that are psychometrically sound for our context. Only once we have identified these measures, can we properly investigate the relationship between empathy and these problematic behaviours Dadds et al., 2008).

The proposed study will investigate the psychometric properties of three internationally used self-report questionnaire measures of empathy in a sample of university students. The Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011), the Interpersonal Reactivity Index (Davis, 1983) and the Toronto Empathy Questionnaire (Spreng et al., 2009) have yielded good psychometric properties in international samples. Their psychometric properties for South African samples are unknown, aside from one study reporting satisfactory performance of the QCAE (i.e., Pileggi, 2018).

Defining empathy and its association with aggression

When developing a measure, operationally defining the construct to be measured is key (Foxcroft, 2004). Defining empathy, however, is particularly challenging. The general consensus has been that empathy consists of at least a cognitive component (i.e., appropriately perceiving and understanding the perspective of others) and an affective component (i.e., sharing the emotional state of others; Jolliffe & Farrington, 2007;

Luckhurst et al., 2017; Preston & De Waal, 2002). Consequently, researchers developing measures of empathy, and particularly questionnaire measures, have employed this operational definition (see Dadds et al., 2008; Davis, 1983; Reniers et al., 2011). Furthermore, many international studies specifically speak to the relationship between cognitive empathy and/or affective empathy and aggressive, antisocial and/or criminal behaviour when investigating the relationship between empathy and such behaviours (e.g., Euler et al, 2017; Jolliffe & Farrington, 2007; Moeller et al., 2001; Noten et al., 2019; Van Langen et al., 2014)

In South Africa, the relationship between empathy and aggressive behaviour has been scarcely investigated (see Malcolm-Smith et al., 2015; Pileggi, 2018). In these studies, two questionnaire measures of empathy have been utilized. The first of these is the Griffith's Empathy Measure (GEM; Dadds et al., 2008). Although its developers report the GEM to be a reliable measure of empathy, with a scale Cronbach's alpha of .81, Malcolm-Smith and colleagues (2015) report poor alpha values in their sample of 115 Grade 1 students at an English medium school in Cape Town (α=.47). Malcolm-Smith and colleagues (2015) proposed that this poor internal consistency may be a consequence of difficulty in the comprehension of a nine-point Likert scale. Consequently, a simplified version with three instead of nine response options was utilized by Louw (2014), in a sample of 92 children and parents at an English medium. This simplified version of the GEM performed better (α=.73). Similarly, this measure has reported less than ideal psychometric properties internationally, with researchers citing lack of precision of the cognitive and affective subcomponents in measuring empathy as the underlying reason (Hawk et al., 2013; Murphey, 2017).

The second measure, the QCAE (Reniers et al., 2011), has demonstrated good

psychometric properties to date in terms of reliability and validity (Queirós et al., 2018). In South African samples, it has also performed relatively well, yielding good internal consistency reliability, as well as good discriminant and convergent validity with the IRI – another questionnaire measure of empathy (see Louw, 2014; Nefdt, 2013; Pileggi, 2018). Overall, findings suggest that the GEM – even the simplified version – may not be ideal for use in South African samples, while the QCAE has potential.

Measuring empathy

Empathy has to date been measured by means of various different tasks which include, but are not limited to, face-to-face tasks requiring performance of a task as a response format (e.g., theory of mind tasks), physiological measures, and questionnaires measures. The format of the measurement tool depends on the definition of empathy employed and the topic under investigation. The advantage of using questionnaire measures of empathy, in comparison to others, is that they are more cost and time efficient to employ, and thus allow for easier recruitment of a larger and therefore more representative samples (Terre Blanche et al., 2006). This is ideal for investigating psychometric properties of a measure.

A review of the literature reveals that questionnaire measures of empathy are often employed to investigate the relationship between empathy and aggressive behaviour (e.g., Bussey et al., 2015; Jolliffe & Farrington, 2007; Vachon et al., 2014; Zhou et al., 2003). Furthermore, this review identifies several questionnaire measures of empathy that have been employed internationally to date, namely the Balanced Emotional Empathy Scale (Mehrabian, 1996), Basic Empathy Scale (Joliffe & Farrington, 2006), Empathy Scale (Caruso & Mayer, 1998), Empathy Quotient (Baron-Cohen & Wheelwright, 2004), GEM (Dadds et al., 2008), Interpersonal Reactivity Index (Dadds et al., 2008), Multidimensional Emotional, Feeling and Thinking Scale (Garton & Gringart, 2005), Questionnaire of

Cognitive and Affective Empathy (Reniers et al., 2011) and the Toronto Empathy Questionnaire (Spreng et al., 2009). Of these questionnaires, the QCAE, IRI, and TEQ appear to have the strongest psychometric properties, and are the most widely used measures of empathy (Dadds et al., 2008, Reniers et al., 2011; Spreng et al., 2009).

Context of use

Measures must be appropriate for the context within which they are being used. In South Africa, this means that we need to take into account the multi-cultural and multi-lingual nature of our samples, as well as other factors. As discussed earlier, the QCAE has been employed in both international and South African studies and has demonstrated generally good psychometric properties. It does, however, appear that items assessing cognitive empathy are more internally consistent than those assessing affective empathy, both internationally and locally (Lockwood et al., 2014; Louw, 2014; Nefdt, 2013; Myszkowski et al., 2017; Pileggi, 2018; Reniers et al., 2011). Overall, the QCAE appears to be less reliable in South African studies (overall scale α = .63-.98) than in international studies (overall scale α = .76-.85). Notably, the South African studies had reasonably small sample sizes, which may not have been adequate to adequately assess the psychometric properties of the QCAE. It is, however, also possible that contextual factors may be responsible for some of these differences. For example, Nefdt (2013) cites a language barrier as a potential difficulty in the comprehension of the QCAE by the study sample (i.e., low socio-economic status sample). This highlights the importance of employing measures that take into consideration contextual factors such as this.

Generalizability is further limited as the South African studies in which the QCAE have previously been employed were particularly primary school based, limited only to young South African samples, particularly in the Western Cape and predominantly low-to-middle

socio-economic communities (Louw, 2014; Pileggi, 2018). In these studies, the QCAE was employed as a parent-report questionnaire measure in which both the parent and child's dispositional empathy was measured. Considering factors such as these in the local context, context-sensitive measures are important to adequately assess empathy.

Additionally, it is particularly important to keep studies comparable across contexts. As such, it is ideal to utilise measures that have been used widely and have yielded good psychometric properties. Of the measures reviewed, the IRI and TEQ meet these criteria (Davis, 1983; Spreng et al., 2009). To elaborate, the IRI is reported to be a reliable instrument in measuring dispositional/trait empathy (scale α=.73-.82) and has reported high convergent validity with the QCAE (r=.87 - .88; Queirós et al., 2018). There is much debate on the factor structure of the IRI, as the two-factor model (i.e., Perspective-taking and Empathic Concern subscales) has been hypothesised to be less reliable than four-factor model (i.e., all subscales) (Batanova & Loukas., 2014). While there is an inconsistency, the four-factor model is argued to provide a more comprehensive assessment in measuring empathy (Chrysikou & Thompson, 2016; Loudin et al., 2003). The TEQ has also demonstrated good psychometric properties in terms of reliability (overall scale α=.71-.85; Barry et al., 2014; Spreng et al., 2009; Totan et al., 2012; Youseff et al., 2014) and validity, reporting good convergent validity with the IRI (r=.71.-.74; Spreng et al., 2009). The psychometric properties of these two well-known and widely used measures for a South African context are yet to be determined.

Furthermore, as mentioned earlier, studies investigating the relationship between empathy and aggressive, antisocial and/or criminal behaviour have often utilised measures that assess both cognitive and affective empathy (Diaz-Galván et al., 2015; Gonzalez-Gadea et al., 2014; Van Zonneveled et al., 2017). Of the two measures identified above, only the

IRI fits this bill as it conceptualises empathy as a multidimensional construct including cognitive empathy (using the *Perspective -Taking* subscale) and affective empathy (using the *Emotional Contagion* subscale) (Davis, 1983; DeCorte et al., 2007; Fernández et al., 2011). The TEQ, on the other hand, does not measure cognitive and affective empathy respectively – it has reported to be a psychometrically sound measure of empathy, defining empathy as an emotional process (Spreng et al., 2009). Notably, the TEQ has demonstrated good convergent validity with the affective component of the IRI (Spreng et al., 2009). Therefore, based on these criteria, the selection of these three measures (i.e., QCAE, IRI and TEQ) appear to be the best measures of empathy.

Rationale, Specific Aims and Hypotheses

Psychometrically sound measures are key in conducting research (Foxcroft, 2004). A substantial body of international literature has explored the construct of empathy, specifically cognitive and affective empathy, as a predictor of aggression through the employment of several questionnaire measures of empathy (Jolliffe & Farrington, 2007; Moeller et al., 2001; Toten et al., 2019; Van Langen et al., 2014; Van Zonneveld et al., 2017). This topic is of particular importance in South Africa – given of the highest rates of aggressive, antisocial and criminal behaviours (Kang'ethe et al., 2016; Matthews et al., 2019; Sommer et al., 2017; Statistics South Africa, 2019), understanding the predictors of such behaviours is essential in allowing us to work towards reducing these behaviours (Menesini & Salmivalli, 2017). Given that research relies on reliable measures, it is imperative that the psychometric properties of measures of empathy are assessed in the South African context.

The relationship between empathy and aggressive, antisocial, and criminal behaviour in SA is not well-researched (see only Malcolm-Smith et al., 2015 and Pileggi, 2018).

What is more is that the two studies investigating this topic in SA (cited above) have revealed a need to assess the psychometric properties of questionnaire measures of empathy. While the QCAE has demonstrated potential usefulness in terms of reliability in SA samples (Louw, 2014; Pileggi, 2018), findings are limited in generalizability and comprehension among the sampled South African population. While such measures may be applicable in other contexts, they may not be well-suited for South Africa's unique multicultural and multilingual context (Foxcroft, 2004). Further assessment of the psychometric properties of the QCAE is therefore necessary. Although the Griffiths Empathy Measure (GEM) has been employed in South Africa (Louw, 2014; Malcolm-Smith et al., 2015), its psychometric properties have been poor.

The primary objective of this study was to assess the psychometric soundness of three questionnaire measures of empathy, which can then be used in research studies in SA such as looking at the relationship between empathy and aggressive, antisocial, and criminal behaviour. This study investigated the reliability (via internal consistency analyses) and validity (via convergent validity analyses) of three questionnaire measures of empathy, namely the QCAE (Reniers et al., 2011), the IRI (Davis, 1983), and the TEQ (Spreng et al., 2009).

Since the QCAE has demonstrated potential usefulness in South African samples, it was included as one of the questionnaire measures. The other two measures chosen to be assessed, namely the TEQ and the IRI, were selected based on (1) whether they are widely-used, (2) whether they have yielded good psychometric properties to date, and (3) that they ideally assess empathy as a multi-dimensional construct, including at least cognitive and affective components. These criteria were important as being widely used would allow for international and national comparison, good psychometric properties

make for useful measures, and given the general way in which empathy is investigated in relation to aggressive, antisocial, and criminal behaviour (i.e., cognitive vs. affective).

Based on the performance of the measures (internationally, and the QCAE also in SA), we hypothesised the following:

1. The QCAE and the IRI would demonstrate better internal consistency when compared to the TEQ.
2. The QCAE affective empathy subscales would demonstrate better internal consistency when compared to the IRI affective empathy subscales.
3. The QCAE cognitive empathy subscales would demonstrate better internal consistency when compared to the IRI cognitive empathy subscales.
4. All three measures should converge (i.e., correlate with each other) in terms of overall scale scores, as well as affective and cognitive subscale scores in the cases of the QCAE and the IRI.

One must, however, bear in mind that these expectations were based on predominantly international literature. Since the psychometric properties of the IRI and TEQ are unknown in South African samples, it is difficult to hypothesize which of these three measures would perform best in South African samples – hence investigation of their psychometric soundness.

Method

Design and Setting

An intra-individual cross-sectional design was employed to compare the psychometric properties of three questionnaire measures of empathy, namely the QCAE (Reniers et al., 2011), the IRI (Davis, 1983) and the TEQ (Spreng et al., 2009). The cognitive and affective empathy subscale totals for the QCAE and IRI were also calculated. Internal

consistency was calculated to investigate the reliability of each of these questionnaires, including respective cognitive and affective empathy subscales. Convergent validity was calculated across all three questionnaire measures as well as their subscales. Item analysis was conducted to identify any problematic items. Exploratory Factor Analysis was employed to assess construct validity of two questionnaires, namely the QCAE and IRI.

Participants

Convenience sampling was employed to recruit Psychology students from the University of Cape Town (UCT) via the Department of Psychology's Student Research Participation Programme (SRPP). In total, 376 undergraduate Psychology students aged 18 years and older participated in this study, with the majority identifying as female (n = 309; 82.18%) and as English first-language speakers (n = 257, 68.35%).

Exclusion criteria. Exclusion criteria included a diagnosis of Autism Spectrum Disorder (ASD), as deficiencies in empathy are known to characterize ASD (American Psychiatric Association (APA), 2013). A reported history of oppositional defiant disorder also ensured exclusion, given the association with psychopathy and thereby decreased empathy (APA, 2013)

Materials

General measure. ***Demographic questionnaire.*** A brief demographic questionnaire was administered to collect basic information including participant's name and student number for the allocation of SRPP points upon completion of the study (see Appendix A). Demographic information about age and clinical/neurological diagnoses was collected to determine participation eligibility. Additionally, information about clinical diagnoses and sex were collected to determine any correlation between these variables and empathy, as is often observed in the literature (Clarke et al., 2016; Matthew et al., 2019; Rueckert &

Naybar, 2008; Shah et al., 2019; Van der Graaff et al., 2018).

Measures of empathy. In order to fully account to the varied conceptualisations of empathy in the literature, three measures were chosen to represent how empathy has been operationalised, and to verify the conceptual overlap of these questionnaires (i.e., to ensure they all measure this construct of empathy).

Questionnaire of Cognitive and Affective Empathy (QCAE). The Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011; Appendix B) is a 31 item questionnaire said to measures trait empathy (i.e., an individual's general dispositional to behave empathetically) including cognitive (e.g., "I sometimes find it difficult to see things from another's point of view") and affective empathy (e.g., "I am usually objective when I watch a film or play, and do not often get completely caught up in it."). All 31 items are scored on a four-point Likert scale ranging from "strongly disagree" (scored as 0) to "strongly agree" (scored as 4). The scores are counted to obtain an overall maximum score of 134, 76 for cognitive empathy (19 items) and 48 for affective empathy (12 items). Higher scores indicate higher trait empathy.

The QCAE is derived from several previously developed questionnaire measures of empathy including the Empathy Quotient (Baron-Cohen et al., 2003), the Hogan Empathy Scale (Hogan, 1969), the IRI (Davis, 1983) and the Impulsiveness-Venturesomeness-Empathy Inventory (Eysenck & Eysenck, 1978). The QCAE has also been used in South Africa, yielding satisfactory overall internal consistency reliability values of .63-.95. Although the cognitive empathy subscale has performed relatively well (α= .87-.94; Louw, 2014; Nefdt, 2013; Pileggi, 2018), the affective empathy subscale has yielded less reliable scores at times (α= .62-.88). Internationally, the QCAE has demonstrated good psychometric properties by its developers (Reniers et al., 2011: scale α=.85; cognitive

subscale α=.83-.85; affective subscale α=.65-.72) as well as in other samples (see Lockwood et al., 2014 and Myszkowski et al., 2017). Additionally, high convergent validity has been observed between the cognitive subscale of the QCAE and the *Perspective-Taking* subscale of the IRI which measures cognitive empathy (r =.87 - .88; Queirós et al., 2018).

Interpersonal Reactivity Index (*IRI*). The Interpersonal Reactivity Index (IRI; Davis, 1983; see Appendix C) is a 28-item self-report questionnaire measure of trait empathy. The IRI defines empathy as a multifaceted construct (Davis, 1983), consisting of 4 subscales which tap into cognitive empathy (i.e., *Perspective-Taking* and *Fantasy*, subscales) and affective empathy (i.e., *Empathic Concern* and *Personal Distress* subscales). Items that measure cognitive empathy include "I sometimes find it difficult to see things from the "other guy's" point of view" from the *Perspective-Taking* subscale. Items that measure affective empathy include "In emergency situations, I feel apprehensive and ill-at-ease" from the *Personal Distress* subscale. Items are scored on a five-point Likert scale ranging from "does not describe me well" (scored as A, or 0 numerically) to "describes very well" (scored as E, or 5 numerically). The alphabetic scores are further coded into numeric scores to conduct analysis, resulting in a maximum score of 28 for each subscale (7 items per subscale), and an overall scale maximum of 112. Higher scores correspond with higher levels of trait empathy.

To our knowledge, the IRI has been employed in one study in the South African context (MacRitchie & Leibowitz, 2010), although its psychometric properties have not been established. However, assessed as a two-factor model (i.e., *Perspective-Taking* and *Empathic Concern* subscales) in international studies, the IRI has yielded good psychometric properties (overall scale α= .82 and .84), with the *Perspective-Taking*

(cognitive) subscale α=.80 and .81, and the *Empathic Concern* (affective) subscale α=.82 and .84 (Batanova & Loukas, 2014 ; Loudin et al., 2003). Assessed as a four-factor model, the IRI yielded satisfactory but lower reliability than the two-factor model (*Perspective-Taking* α= .73; *Fantasy* α=.76-. 83-; *Empathic Concern* α=.73; *Personal Distress* α=.70-.77). Overall internal consistency reliability was also satisfactory at .77 and .73 (DeCorte et al., 2007; Fernández et al., 2011). Furthermore, high convergent validity has been observed between the IRI *Empathic Concern* subscale and the TEQ (*r*=.71-.74), while the *Perspective-Taking* subscale items did not correlate with the TEQ (*r*=.35; Spreng et al., 2009).

Toronto Empathy Questionnaire (TEQ). The Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009; Appendix D) is a 16-item self-report questionnaire designed to measure trait empathy. According to its developers, this questionnaire is more suited to measure affective empathy. The items are scored on a five-point Likert scale ranging from "never" (scored a 0) to "always" (scored a 4). The item responses are counted for a maximum total score of 64, with higher scores indicative of higher levels of empathy.

The TEQ has not been used in South Africa, nor has its psychometric properties been established. However, it is reported as a reliable measure of empathy, yielding satisfactory good consistency reliability (α=.85; Spreng et al., 2009). In other international studies, the TEQ has also yielded satisfactory to good alpha values ranging between .71 - .85 (see Barry et al., 2014; Kourmousi et al., 2017; Pongrac et al., 2019; Totan et al., 2012; Youseff et al., 2014). Furthermore, discriminant and convergent validity have been observed with the *Empathic Concern* subscale of the IRI (*r*=.74) (Spreng et al., 2009).

Procedure

After ethical approval was granted by the UCT Department of Psychology, the survey

was set up on the Survey Monkey platform. The study was advertised on the SRPP site, and the link the study was provided on the study advert (See Appendix E). Upon consenting to and entering the study, participants were given information about the study and the format of the survey. Informed consent was obtained from them before they proceeded onto the brief demographic questionnaire.

After completing the demographic questionnaire, participants proceeded onto the empathy questionnaires, starting with the QCAE, followed by the IRI, and finally the TEQ. The questionnaires took no more than 45 minutes for each participant to complete. After the completion of the survey, participants were thanked for their participation and provided with the researchers contact details should they request further information.

Data Analysis

R Programming Language (R Version 3.3.2, R Core Team, 2014) was used for all statistical analyses. Descriptive statistics were calculated to acquire the central tendency and distribution of the participant demographics and the empathy scores. Gender differences were assessed using Welch's two-sample *t*-test, a nonparametric equivalent of the student *t*-test which is more robust to large sample size differences (Delacre et al., 2017). Assumptions were upheld unless otherwise stated.

To assess reliability, Cronbach's alpha values were calculated for all questionnaires and their affective and cognitive subscales, as this is the most scientifically robust measure of internal consistency reliability (Kaplan & Sacuzzo, 2009; Rust & Golombok, 2009). Item-total correlations assessed the extent to which the items represent the overall construct of empathy and determine potentially problematic items for the current sample (Kaplan & Sacuzzo, 2009; Rust & Golombok, 2009).

For the main analyses of the QCAE and the IRI, exploratory factor analysis (EFA)

was computed to determine whether the items do load onto the subscales which are said to tap into cognitive or affective empathy. Furthermore, a direct oblimin rotation was conducted and the items were forced to load onto the number of components of the respective subscales to compare to results in previous findings. Finally, construct validity were assessed by calculating Pearson-Product Moment correlations across the subscales for the QCAE and IRI with the TEQ to investigate the degree to which the questionnaires converge or diverge on the construct of empathy.

Ethical considerations

Consent and Confidentiality

In keeping with principles of informed consent (see Appendix F), participants were briefed about the aims and purpose and benefits of the study. Confidentiality was maintained by explaining to participants that all provided information will remain confidential and confined to the utilization for research purposes only. Furthermore, all collected data was stored in a password secured computer and was only be made available to primary researchers. Voluntary participation was explained and participants were assured that they may discontinue their participation with no consequences befalling them.

Risks and benefits

The study encompassed no foreseeable risks or harm that may implicate participants. Furthermore, participation in the study will allocate course credit (i.e., one SRPP point) to the respective Psychology course that the participant provided in the demographic questionnaire (see Appendix A). SRPP course credits will be carried over to next year.

Results

Sample Characteristics

In total, 495 survey responses were received. However, 119 participants did not complete the questionnaires, and a further 11 were under the age of 18. Consequently, 376 undergraduate Psychology students aged 18 and above completed all three questionnaires, the majority identifying as female (*n*= 309, 82.18%), 67 (17.82%) identifying as male, and 1 (0.27%) participant identified as Other. Descriptive statistics are presented in Table 1 below. While most participants identified themselves as English first-language speakers (*n*= 257, 68.35%), various other first-languages were reported (isiXhosa: *n*=33, 8.78%; isiZulu: *n*=25, 6.65%; Setswana: *n*= 1, 2.93%; Sepedi : *n*=10, 2.66%; Afrikaans: *n*=9, 2.39%; Sesotho: *n*=8, 2.13%; Tshivenda: *n*=7, 1.86%; Shona: *n*=5, 1.33%; Xitsonga: *n*=4, 1.06%; Mandarin: *n*=3, 0.80%; SiSwati and Ndebele: *n*=2, 0.53%; Portuguese and German: *n*=2, 0.53%). In terms of the presence of clinical diagnoses, Mood Disorder and Anxiety Disorder were reported most often (*n*=21 and *n*=28, respectively), and most often by females (*n*=17; *n*=24, respectively). Moreover, 26 participants reported comorbid Mood and Anxiety Disorders.

Welch's independent sample *t*-test was computed to investigate empathy between male and female participants (see Table 2 below). The overall empathy scores were significantly higher for female participants across all three questionnaires, compared to the male participants; QCAE (t (373) =3.91, p<.001), IRI (t (357) = 4.18, p<.001, TEQ (t (347) = 5.19, p<.001). Furthermore, females also performed higher on both cognitive and affective empathy across all three questionnaires; QCAE cognitive empathy (t (373) =1.97, p =.005), QCAE affective (t (373) = 4.78, p<.001). IRI cognitive (t (357) = 2.35, p =.002), IRI affective (t (357) =4.50, p<.001). This is not surprising, given literature

supporting sex differences in this direction (e.g., Davis, 1980; Reniers et al., 2011; Spreng et al., 2009; Totan et al., 2012).

Table 1

Welch's two-sample t-test comparing gender differences for the QCAE, IRI and TEQ

Empathy measure	Gender						
	Females (*n*=309)		Males (*n*=66)				
	M	*SD*	*M*	*SD*	Welch's t-test	*p*-value	Cohen's *d*
QCAE overall empathy	98.42	9.94	93.30	10.92	*t* =3.91	*p*<.001	.50
QCAE cognitive empathy	61.67	6.96	60.07	7.62	*t* =1.97	*p*=.005	.22
QCAE affective empathy	36.75	5.48	33.23	5.48	*t* =4.78	*p*<.001	.61
IRI overall empathy	76.84	13.52	70.40	11.02	*t* =4.18	*p*<.001	.55
IRI cognitive empathy	40.36	7.07	38.27	7.75	*t* =2.35	*p*=.02	.29
IRI affective empathy	36.48	7.04	32.13	7.76	*t* =4.50	*p*<.001	.59
TEQ	51.59	6.65	46.21	9.47	*t* =5.19	*p*<.001	.73

Reliability Analysis

Cronbach's Alpha was calculated to assess internal consistency of each questionnaire measure. Notably, Cronbach's alpha values above .70 are regarded as acceptable, values above .80 as good and values above .90 as excellent (Cortina, 1993; Koonce & Kelly, 2014). Internal consistency reliability analyses yielded at least satisfactory alpha values for all three questionnaires: Both the TEQ and QCAE reported Cronbach alpha yielded values of .84, with the IRI yielding a Cronbach's alpha value of .78. The Cronbach's alpha values of the QCAE and IRI and were calculated to compare the cognitive and affective empathy

subscales of the QCAE and the IRI questionnaire measures. Accordingly, the cognitive empathy subscale of the QCAE demonstrated better internal consistency compared to the IRI (α=.83 vs. α=.72). Similarly, the affective empathy subscale of the QCAE demonstrated better internal consistency compared to the affective empathy subscale of the IRI (α=.79 vs. α=.73). This illustrates that overall and in the individual subscales, the QCAE performed better when compared to the IRI. Accordingly, the QCAE and the TEQ proves to be best suited for our sample.

Further investigation of each measure by means of item-total correlations revealed the following: Several item-total correlations for the QCAE were below 0.3 (i.e., items 2, 3, 22 and 28). Similarly, several item-total correlations were on the IRI were below 0.3 (i.e., 16, 21, 24, 25 and 28). Notably, there were no low item-correlations in the TEQ. As the goal of this study was not to construct new questionnaires, the items were not removed, but rather flagged for their statistical and theoretical failure within the sample. Overall, then, while the QCAE and IRI seems to have room for improvement, the TEQ's items seem to represent the overall construct of empathy very well.

Construct validity between the QCAE, IRI and TEQ

Convergent validity. All the measures of empathy were correlated to examine convergent validity (see Table 3 below). All 3 measures yielded significant positive correlations with each other's overall scores, with scores converging (QCAE vs. TEQ, r=0.60, p<.001; QCAE vs. IRI, r=.56, p<.001; TEQ vs IRI, r=.56, p<.001). However, the 5 subscales of the QCAE and 4 subscales of the IRI mostly yielded low, but significant positive correlations within their respective subscales, ranging from r=.11 to r=.52 for the QCAE, and r=.09 to r=.33. Furthermore, the *Peripheral Responsibility* and *Fantasy* subscales of the QCAE and IRI, respectively, yielded significant, moderate

correlation with each other (r=.69, p<.001). The highest convergent validity was found between the TEQ and the *Empathic Concern* subscale of the IRI (r=.71, p>.001).

Discriminant validity. After correlating the subscales of the measures, a significant but low negative correlation was found between the QCAE's *Perspective-Taking* and the IRI's *Personal Distress* subscales (r=-24, p<.001; see Table 2). Furthermore, another negative correlation was observed between the QCAE *Online Simulation* and IRI *Personal Distress* subscale (r=-.08, p>.05), however this correlation was not statistically significant.

Table 2

Correlations between the subscales of the QCAE, IRI and TEQ.

Empathy measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. QCAE Online Simulation	1	.37***	.18***	.27***	.15**	.17***	.73***	-.08	.32***	.38***
2. QCAE Perspective-Taking		1	.11*	.23***	.13**	.14***	.25***	-.24***	.10	.27***
3. QCAE Peripheral Responsibility			1	.39***	.30***	.69***	.11*	.14**	.41***	.41***
4. QCAE Proximal Responsibility				1	.52***	.33***	.18***	.10*	.52***	.63***
5. QCAE Emotional Contagion					1	.32***	.02	.38***	.36***	.38***
6. IRI Fantasy						1	.09	.19***	.33***	.28***
7. IRI Perspective-Taking							1	-.09	.32***	.34***
8. IRI Personal Distress								1	.18***	.06
9. IRI Empathic Concern									1	.71***
10. TEQ										1

Note. The TEQ has no subscales because it is a unidimensional measure of empathy

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

Factor Analysis of the QCAE and IRI

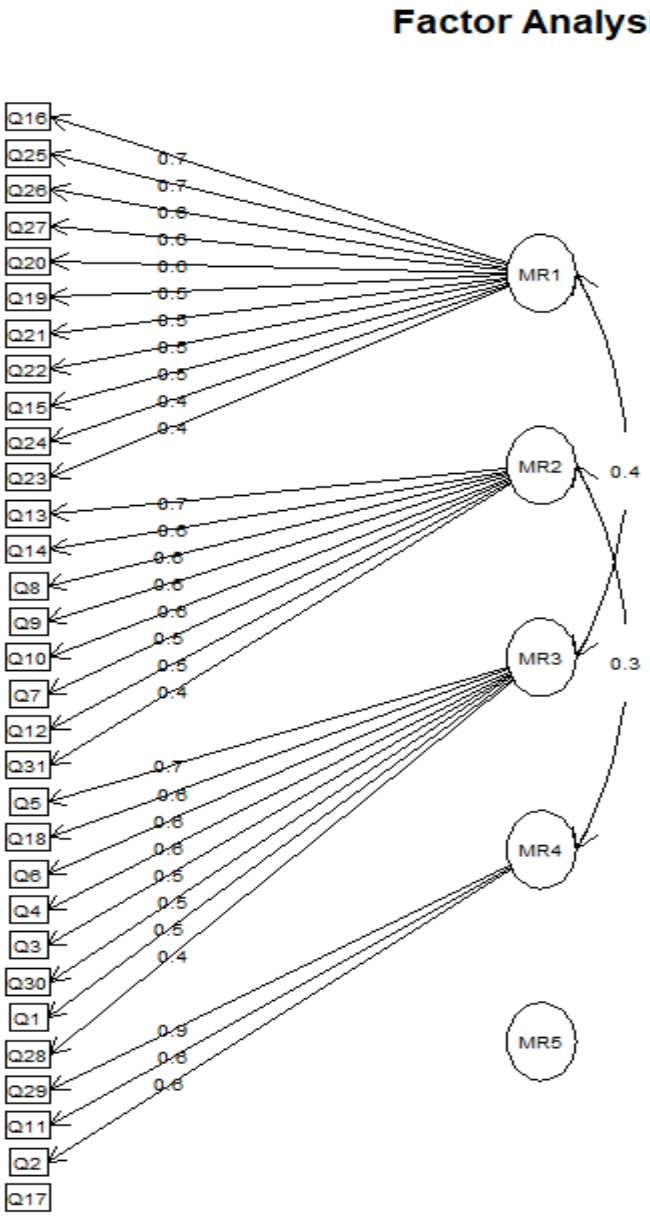
EFA was utilised to assess the factor structure of the QCAE and IRI and, specifically, to assess whether the questionnaires for this study yielded similar factor structures as the literature indicates (Tredoux & Durrheim, 2018). The authors of the QCAE indicate a 5 - factor solution for the QCAE, with factors *Online Stimulation*, *Perspective-Taking*, *Peripheral Responsibility*, *Proximal Responsibility* and *Empathic Concern*, while the authors of the IRI indicated a 4-factor solution with factors, *Emotional Contagion*, *Personal Distress*, *Fantasy Scale* and *Perspective-Taking*.

PCA with direct oblimin rotation was conducted to investigate the 5-factor structure of the QCAE. The Kaiser-Meyer-Olkin (KMO; Kaiser, 1974) value of sampling adequacy was .83. All items indicated values above .70. Bartlett's test of sphericity (Bartlett, 1954) was equal to 456.83 (p<.001). A scree plot (Cattell, 1996) revealed the presence of 5 components, which was confirmed by Horn's parallel analysis. These 5 factors would be interpreted as the 5 dimensions of the QCAE (Reniers et al., 2011). 11.1%, 8.9%, 8.2%, 5.4% and 2.6% of variance is respectively explained by each factor. Furthermore, items for *Online Stimulation*, *Perspective-Taking* and *Peripheral Responsibility* subscales loaded predominantly onto the expected subscales (see Figure 1 below), with the exception of items 23, 17 and 31. *Perspective-Taking* and *Online Simulation* were further grouped together (see Figure 1), accounting for 40% of the variance, further indicating the theoretical similarity of these subscales as measuring cognitive empathy. While *Empathic Concern* and *Proximal Responsibility* were grouped together, as theoretically stated to measures affective empathy, they included the *Peripheral Responsibility* subscale which may explain some similarity between these subscales, and why they collectively explain 30% of the variance (see Figure 1).

Furthermore, the all the items for *Proximal Responsibility* and *Empathic Concern* subscales were combined to form a single factor with item 31 from *Online Simulation*. Additionally, one 'unknown' factor was detected, however none of the scale items loaded heavily on this factor (see Figure 1) and the factor loadings were mainly small and negative (see Appendix G).

Figure 1

PCA diagram of the 5-factor solution of the QCAE



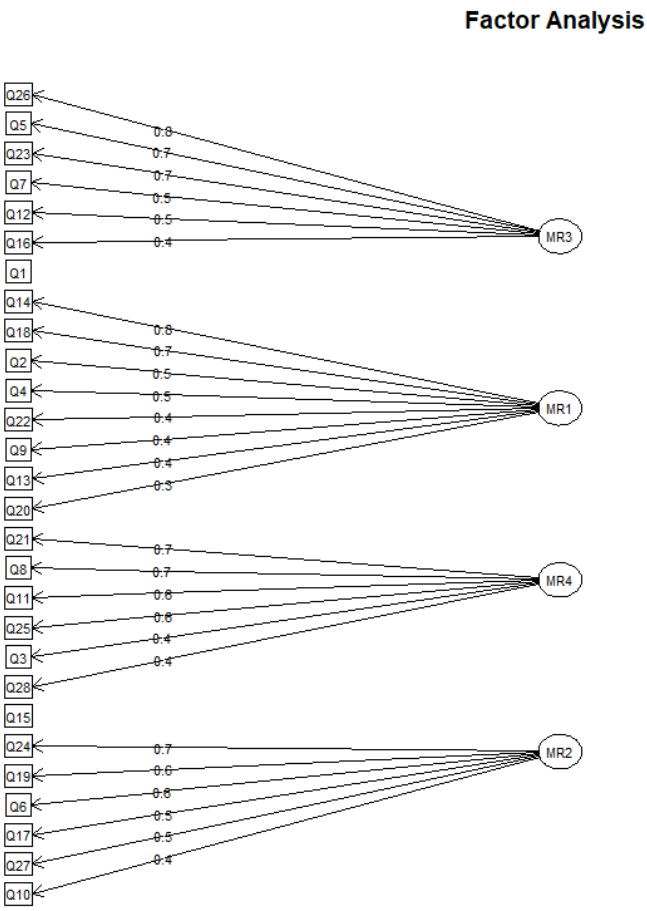
Note. MR 1's factor loading are mostly consistent with the QCAE's *Perspective-Taking* subscale (with item 23 from the *Proximal Responsibility* subscale); MR 2 is a combination of the QCAE's *Emotional Contagion* and *Proximal Responsibility* subscales (with item 31

from *Online Simulation*). MR 3 is mostly consistent with the QCAE's *Online Simulation* subscale (item 31 does not load into this factor). MR 4 is not consistent with any pre-determined factor, having no items which load heavily onto it.

Furthermore, a PCA, using a direct oblimin rotation, was conducted, to keep the 4-factor structure in line with the scree plot and original IRI structure. The *Emotional Contagion*, *Personal Distress*, *Fantasy Scale* and *Perspective-Taking* items loading predominantly onto their expected subscales (see Figure 2 and Appendix I). The KMO (Kaiser, 1974) value of sampling adequacy was .78. The Bartlett's test of sphericity (Bartlett, 1954) was statistically significant ($p<.001$). Observed eigenvalues from the conducted scree test (Cattell, 1996), illustrated 7 components in the data set. These items respectively explained, 4.4%, 3.3%, 2.4%, 1.9%, 1.4%, 1.2% and 1.1% of the variance. Furthermore, 4 factors were illustrated in the dataset. The first factor accounted for the *Emotional Contagion* subscale; loading items 2, 4, 9, 13, 14 and 20. The second factor accounted for the *Personal Distress* subscale; loading items, 6, 10, 17, 19, 24 and 17. The third factor accounted for the *Fantasy* subscale; loading items 5, 7, 12, 16, 23 and 26. Lastly, the fourth factor accounted for the *Perspective-Taking* subscale; loading items, 3, 8, 11, 21, 25 and 28. At best, when forced, the factor structure as indicated by the authors is illustrated.

Figure 2

PCA diagram of the 4-factor solution of the IRI



Discussion

The study investigated the psychometric properties of three questionnaire measures of dispositional empathy, namely the QCAE, the TEQ, and the IRI, for the South African university student context. These three questionnaires are all internationally renowned self-report measures of dispositional empathy. Overall, internal consistency reliability analyses indicated that the QCAE and the TEQ were more reliable when compared to the

IRI. Furthermore, when comparing the cognitive and affective subscales, the QCAE yielded higher internal consistency that the TEQ. The scores from these questionnaires also converged, suggesting good construct validity and convergent validity. Additionally, only the factor structure of the IRI was as indicated by the original authors, while the QCAE demonstrated to be inconsistent. All three of these questionnaires yielded at least satisfactory psychometric properties, with the QCAE appearing to outperform the others for this sample. This discussion will commence with summarising the reliability findings of the three questionnaire measures, followed by a discussion on factor analysis, and convergent and discriminant validity.

Reliability of the Questionnaire Measures

To address the hypotheses, internal consistency of the questionnaire measures was investigated. The findings indicated that both the QCAE and TEQ are reliable measures of empathy, both questionnaires yielding a Cronbach's alpha of .84. Notably, the QCAE is the most reliable for measuring cognitive and affective empathy. The cognitive and affective subscales of the QCAE reported a Cronbach's alpha of .83 and .79, respectively. The performance of the QCAE is consistent across both local and international studies.

The performance of the QCAE may be attributed to the clear and prose language construction of the items (e.g., item 18 - "*I find it easy to put myself in somebody else's shoes*" or item 12 - "*I get upset when I see someone cry*") as well as its 4-point Likert Scale. In comparison to the 5-point Likert Scale of the IRI and the TEQ, the QCAE prompted towards gaining specific responses, void of 'sometimes' or 'neither agree' nor 'neither disagree' responses (Louw, 2014; Reniers et al., 2011). Yielding the same scale alpha as the QCAE (α=.84), the TEQ's performance was consistent with the original study by Spreng et al (2009).

Furthermore, although not best suited for the South African context, the IRI performed satisfactorily with an overall Cronbach's alpha of .78. Similar results were reflected by DeCorte et al. (2007) and Fernández et al. (2011) assessed as the four-factor model, as with the respective study. Although items with low item-total correlations were indicated for both the QCAE and IRI, they were not removed, but rather flagged for their statistical and failure within the sample (Queiros et al., 2018). In keeping with the purpose of the study, the QCAE and TEQ illustrated to be the most reliable questionnaire measures of empathy in the South African context of university students, with the QCAE being best suited to measure both cognitive and affective empathy.

Factor Analysis of the QCAE and IRI

The QCAE was assessed as a 5-factor model to account for each of its dimensions, to investigate to what extent the items load onto the cognitive and affective empathy subscales as observed in the literature. The presence of 5 factors in the QCAE, as confirmed by the scree plot and Horn's parallel analysis, suggest that similar to the prevailing consensus in the literature, empathy is a multidimensional construct (Dadds et al., 2008; Reniers et al., 2011). The 5-factor model was also supported in recent findings by Myszkowski and colleagues (2017). The findings suggest that for this sample, the QCAE does perform consistently with Reniers and colleagues (2011) only for the cognitive subscales (i.e., *Online Simulation*, *Perspective-Taking* and *Peripheral Responsibility*), while the items of the affective subscales (i.e., *Empathic Concern* and *Proximal Responsibility*) did not consistently load onto their respective subscales. Therefore, for this sample, the 5-factor of the QCAE was reduced to 4 factors that actually contain the items.

This lack of conformity of the QCAE to the original study by Reniers and colleagues

(2011) emphasises that empathy is a difficult construct to organise and measure. All the items for *Empathic Concern*, 3 of the 4 items for *Proximal Responsibility* (i.e., item 7, 10 and 12), and 1 item from *Online Simulation* (i.e., item 31 "Before I do something, I try to consider how my friends will react to it.") all loaded onto a single factor. Reniers and colleagues (2011) stated that the *Empathic Concern* subscale measures the automatic mirroring of another person's emotions, while *Proximal Responsibility* measures the affective behavioural response to someone's emotion in close proximity. Perhaps these two subscales were combined to represent the motor and emotional response to other's emotional states (Blair, 2005). Although *Online Simulation* did perform consistently with Reniers and colleagues (2011), it has been criticised for its potentially misleading title, which is known to measure affective empathy in social neuroscientific research (Pongrac et al., 2018; Preston & De Waal, 2002). The grouping of the cognitive subscales (*Online Simulation* and *Perspective-Taking*) suggests that they are theoretically similar to each other (Reniers et al., 2011). However, the *Peripheral Responsibility* (which originally measures cognitive empathy) subscales is more inclined to the affective subscales. This can be attributed to its theoretical similarity to *Proximal Responsibility* as stated by Reniers and colleagues (2011). The inconsistency of the *Peripheral Responsibility* subscale has also been observed in other studies (Horan et al., 2015; Michaels et al., 2014).

Furthermore, Pongrac and colleagues (2018) and Myszkowski and colleagues (2017) have also found that item 17 "It is hard for me to see why some people get upset so much" from the *Peripheral Responsibility* subscale yielded low factor loadings, attributing this to its detachment from the participant's emotions specifically in a non-social context, and the above stated authors have suggested removing this item from the QCAE. Furthermore, the

reverse-wording of this item is also argued to be confusing to some participants. Nonetheless, the performance of the QCAE suggests that for this sample the 5-factor structure may not be necessary to detect empathic abilities, and a 4-factor structure may be more sufficient.

For this study, the IRI was assessed as a four-factor model. The findings were consistent with De Corte and colleagues (2007) and Fernándes and colleagues (2011), both illustrating similar results in the respective studies. De Corte and colleagues (2007) replicated the four-factor model of the original study by Davis (1980) and findings illustrated an appropriate fit between the data and proposed factor structure. The four-factor model illustrated to be best suited for the current study.

The *Emotional Contagion, Perspective-Taking, Personal Distress* subscales and *Fantasy Scale* illustrated alike factor loadings. However, item 13 ("*When I see someone get hurt, I tend to remain calm*") appeared to load on the *Emotional Contagion* subscale, in contrast to its placement on the *Personal Distress* subscale on the original scale. Furthermore, item 1 ("*I daydream and fantasize, with some regularity, about things that might happen to me*") and item 15 ("*If I'm sure I'm right about something, I don't waste much time listening to other people's arguments*") did not load on any of the four subscales, illustrating low factor loadings (.28 and .27, respectively). According to De Corte et al (2007), with regards to item 1, its low factor loading may be attributed to the item content not illustrating any inclination towards empathising with another person. This is in contrast to the remaining 6 items, which loaded appropriately, illustrating an inclination towards imagining oneself in another person's position (De Corte et al., 2007)

Convergent and Discriminant Validity

Correlation analysis was conducted across all three questionnaires, and the results

were supportive of the construct validity of the questionnaires, with instances of both convergent and discriminant validity. All three questionnaires were positively correlated with each other. For cognitive empathy, the QCAE's *Peripheral Responsibility* and the IRI's *Fantasy* subscales were significantly positively correlated. Furthermore, a high correlation was observed between the IRI's *Empathic Concern* subscale and the TEQ. Contrastingly, Spreng and colleagues (2009) only found convergent validity between the TEQ and the IRI's cognitive subscales (i.e., *Perspective-Taking* and *Fantasy*) which they argue is an indication of the conceptual overlap between cognitive and affective empathy and may even indicate to shared cognitive reasoning across both concepts. A neuroimaging study conducted by Gallese (2003) and Gallese and colleagues (2004) concluded that although cognitive and affective are mediated in separate domains, they are represented by the same underlying neurological processes when one is executing some goal-directed behaviour or responding to another's emotional state. However, the discriminant validity observed between the QCAE's *Perspective-Taking* and *Online Simulation* subscales with the IRI's *Personal Distress* subscale, may also support the conceptual difference in cognitive and affective empathy (Reniers et al., 2011).

Sex differences in Empathy

For all three questionnaire measures of empathy, females scored higher on both cognitive and affective empathy subscales as well as overall empathy. This is consistent with literature (Davis, 1980; Reniers et al., 2011; Spreng et al., 2009; Totan et al., 2012). Totan and colleagues (2012) refer to the gender differences as 'distinctive validity', postulating that being female was associated with higher empathy than being male. This emphasises the significance of gender as an important characteristic in determining empathy (Spreng et al., 2009; Totan et al., 2012).

Limitations and suggestions for future research

The presented study is not without its limitations. Firstly, the study recruited participants via convenience sampling employed in the undergraduate Psychology Department at the University of Cape Town. Consequently, results are not generalisable to the general South African population. Secondly, the unequal distribution of male and female participants may bias the results. However, this shortcoming is to some extent overcome by conducting Welch's independent sample t-test, which does not assume equal variance between the samples, and is therefore more suitable for these differences in sample size (Delacre et al., 2017). In addition, consistent with previous results on gender differences in self-report measures for empathy (Reniers et al., 2011; Spreng et al., 2009; Totan et al., 2012), female participants scored significantly higher than male participants on overall empathy, and the cognitive and affective empathy subscales.

Furthermore, there are theoretical problems relating to research in empathy, which is why it is imperative to assess empathy measures given the recent rise of research into this construct (Pongrac et al., 2018). Some researchers have postulated whether dispositional empathy is relatively constant within individuals or if it is situationally dependant (De Wied et al., 2005; Gerdes et al., 2010). Therefore, self-report measures which can account for individual and contextual determinants of empathy should be developed. A psychometrically sound measure of empathy is not only useful to catalogue individual and group differences (Pongrac et al., 2018), but to also examine the association between clinical/neurological diagnoses (i.e., MDD and ASD; APA, 2013; Matthew et al, 2019; Shah et al., 2019), anti-social behaviour and aggression with empathy (Gantiva et al., 2018; Sest & March., 2017), in which aggression is particularly prevalent in the South African context (Sommer at al., 2017). Except for the Simplified-GEM (Louw, 2014), no

other self-report measures of empathy have been specifically developed for the South African context. Furthermore, it has been argued that self-report measures are cost-effective, easy to administer to large sample and are accessible (Pongrac et al., 2018; Reniers et al., 2011). Therefore, we hope that this study will channel more research into conceptualising empathy as a multidimensional construct and designing measures that are suitable for the South African university student context. This will provide researchers with more knowledge into the nature of social cognition and empathy for the South African youth and assist in designing interventions to mitigate instances of violence in this age cohort.

Conclusion

The analyses of the psychometric properties of the QCAE, IRI and TEQ has demonstrated that the all three questionnaire measures of empathy are reliable and valid self-report measures of empathy. However, the QCAE has illustrated to be the best suited questionnaire measure of dispositional empathy for the South African student context, particularly should one wish to measure cognitive and affective dispositional empathy. Furthermore, findings revealed the QCAE's inconsistency with the original QCAE factor structure for this sample, while the IRI produced results consistent with the literature. Convergent validity was observed across all three questionnaires, although discriminant validity was evident with the QCAE's *Online Simulation* and *Perspective-Taking* subscales, with the IRI's *Personal Distress* subscale. Consistent with the literature, female participants scored higher on overall, cognitive and affective empathy subscales than male participants.

Despite its limitations, the aims and the objectives of the study were achieved. This study is an important contribution to the utilisation of psychometrically sound self-report

measures for use in future research. For example, to aid in the understanding of the contributing predictors as well as the reduction of the high rates of deviant behaviours in the South African context-particularly considering how scarcely its relationship to empathy has been investigated in the local context.

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Appendix A

Demographic questions

1. Please provide your name and surname:

2. Please provide your student number:

3. What is your home language?

4. Please provide the **correct** course code of the psychology course for which you would like to receive the SRPP point:

5. Have you been diagnosed with a clinical/neurological disorder (such as Autism Spectrum Disorder)?

   NO
   YES
   If YES, please provide the diagnosis:

   _____

6. Are you above the age of 18?
   NO
   YES

7. Please select your sex:
   FEMALE
   MALE
   OTHER

   Please click on “next” to begin the study

   NEXT

Appendix B
QCAE

People differ in the way they feel in different situations. Below you are presented with a number of characteristics that ***may or may not apply to you***. Read each characteristic and indicate how much you agree or disagree with the item by selecting the appropriate box. Answer quickly and honestly.		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	I sometimes find it difficult to see things from another's point of view.				
2.	I am usually objective when I watch a film or play, and do not often get completely caught up in it.				
3.	I try to look at everybody's side of a disagreement before I make a decision.				
4.	I sometimes try to understand my friends better by imagining how things look from their perspective.				
5.	When I am upset at someone, I will usually try to "put myself in the person's shoes" for a while.				
6.	Before criticizing somebody, I try to imagine how I would feel in their place.				
7.	I often get emotionally involved in my friends' problems.				
8.	I am inclined to get nervous when others around me seem nervous.				
9.	People I am with have a strong influence on my mood.				
10.	It affects me very much when one of my friends seems upset.				
11.	I often get deeply involved with the feelings of a character in a film, play, or novel.				
12.	I get very upset when I see someone cry.				
13.	I am happy when I am with a cheerful group and sad when others are glum.				
14.	It worries me when others are worrying and panicky.				
15.	I can easily tell if someone else wants to enter into a conversation.				
16.	I can quickly pick up if someone says one thing but means another.				
17.	It is hard for me to see why some things upset people so much.				
18.	I find it easy to put myself in somebody else's shoes.				
19.	I am good at predicting how someone will feel.				
20.	I am quick to spot when someone in a group is feeling awkward or uncomfortable.				
21.	Other people tell me that I am good at understanding what others are feeling and what others are thinking.				
22.	I can easily tell if someone else is interested or bored with what I am saying.				
23.	Friends talk to me about their problems as they say that I am very understanding.				

24.	I can sense if I am intruding, even if the other person does not tell me.				
25.	I can easily work out what another person might want to talk about.				
26.	I can tell if someone is masking their true emotion.				
27.	I am good at predicting what someone will do.				
28.	I can usually appreciate the other person's viewpoint, even if I do not agree with it.				
29.	I usually stay emotionally detached when watching a film.				
30.	I always try to consider the other person's feelings before I do something.				
31.	Before I do something, I try to consider how my friends will react to it.				

Appendix C
IRI

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate option. Read each item carefully before answering. Answer as honestly as you can		Does describe me very well	Somewhat describes me well	Neither	Somewhat does not describe me well	Does not describe me very well
1.	I daydream and fantasize, with some regularity, about things that might happen to me.					
2.	I often have tender, concerned feelings for people less fortunate than me.					
3.	I sometimes find it difficult to see things from the "other guy's" point of view.					
4.	Sometimes I don't feel very sorry for other people when they are having problems.					
5.	I really get involved with the feelings of the characters in a novel.					
6.	In emergency situations, I feel apprehensive and ill-at-ease.					
7.	I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.					
8.	I try to look at everybody's side of a disagreement before making a decision.					
9.	When I see someone being taken advantage of, I feel kind of protective towards them.					
10.	I sometimes feel helpless when I am in the middle of a very emotional situation.					
11.	I sometimes try to understand my friends better by imagining how things look from their perspective.					
12.	Becoming extremely involved in a good book or movie is somewhat rare for me.					
13.	When I see someone get hurt, I tend to remain calm.					
14.	Other people's misfortune does not usually disturb me a great deal.					
15.	If I'm sure I'm right about something, I don't waste time listening to other people's arguments.					
16.	After seeing a play or movie, I have felt as though I were one of the characters.					
17.	Being in a tense emotional situation scares me.					
18.	When I see someone being treated unfairly, I sometimes don't feel very much pity for them.					
19.	I am usually pretty effective in dealing with emergencies.					
20.	I am often quite touched by the things I see happen.					
21.	I believe that there are two sides to every question and try to look at them both.					

22.	I would describe myself as a pretty soft-hearted person.					
23.	When I watch a good movie, I can very easily put myself in the place of a leading character.					
24.	I tend to lose control during emergencies.					
25.	When I'm upset at someone, I usually try to "put myself in his shoes" for a while.					
26.	When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.					
27.	When I see someone who badly needs help in an emergency, I go to pieces.					
28.	Before criticizing somebody, I try to imagine how I would feel if I were in their place.					

Appendix D
TEQ

Please read each statement below carefully and rate how frequently you feel or act in the manner described. There are no right or wrong answers or trick questions. Please answer each question as honestly as you can.		Never	Rarely	Sometimes	Often	Always
1.	When someone is excited, I tend to get excited too.					
2.	Other people's misfortune does not disturb me a great deal.					
3.	It upsets me to see someone being treated disrespectfully.					
4.	I remain unaffected when someone close to me is happy.					
5.	I enjoy making other people feel better.					
6.	I have tender, concerned feelings for people less fortunate than me.					
7.	When a friend starts to talk about his/her problems, I try to steer the conversation towards something else.					
8.	I can tell when others are sad even when they do not say anything.					
9.	I find that I am "in tune" with other people's moods.					
10.	I do not feel sympathy for people who cause their own serious illness.					
11.	I become irritated when someone cries.					
12.	I am not really interested in how other people feel.					
13.	I get a strong urge to help when I see someone who is upset.					
14.	When I see someone treated unfairly, I do not feel very much pity for them.					
15.	I find it silly for people to cry out of happiness.					
16.	When I see someone being taken advantage of, I feel kind of protective towards him/her.					

Appendix E

Dear Student,

We are Honours students conducting a study in the Department of Psychology. This is an important study and aims to investigate the psychometric properties of three questionnaire measures of empathy in South Africa. In other words, we want to see if these questionnaires are suitable to use in South African samples. If you choose to participate in the study, you will be invited to complete three online questionnaires, which will take you no more than 45 minutes to complete. Upon completion of the surveys, you will be awarded **1 SRPP point.** This point will be carried over to next year.

Please note that to participate in the study, you need to be at least 18 years of age and be a psychology undergraduate student. The study is completely voluntary, and you may withdraw participation from the study without any penalty. However, **you will only be awarded the SRPP point if you complete all three questionnaires.**

Should you participate in the study, you will be directed to an online platform, where you will be asked to sign a consent form, complete a brief demographic questionnaire, followed by 3 questionnaires. Your survey responses are completely anonymous. Your responses will remain confidential and will be kept in a password protected laptop. There are also no associated risks with participating in the study.

If you would like to participate in the study, please click on the link below. You will need to complete the survey in one sitting for your responses to be recorded accordingly.

Survey link: https://www.surveymonkey.com/r/YY7XTFG

If you have any questions, please email the researchers: grqeri001@gmail.com and mlmzin002@myuct.ac.za.

Best wishes,

Erin and Zintle

Appendix F

Informed Consent Form

University of Cape Town

Dear student,

Establishing the reliability and validity of three questionnaire measures of empathy

Study Purpose

You are invited to participate in a study investigating the usefulness of three questionnaires in South African university students. This study forms part of our degree in the Department of Psychology of the University of Cape Town. The purpose of the study is to establish the reliability and validity of three questionnaire measures of empathy. What this means is that we want to see which one of these three questionnaires is best suited and useful for the sample of South African university students.

What will you do?

Should you decide to participate in the study, you will be asked to answer some basic demographic questions including your name, student number and course code for SRPP credits upon completion of the study. You will then be presented with the three questionnaires, which must be completed in one sitting. Altogether this study will take no more than 45 minutes of your time.

Risks and benefits to you?

There are no risks for participating in this study. Upon completion of this study, you will be awarded 1 SRPP point toward the psychology course of your choosing. This credit will be carried over to next year's courses.

Your rights

Participation in this study is voluntary. Should you wish to withdraw at any point, you may do so freely. There are no consequences attached to your course if decided you choose to withdraw from the study. All information from this study will be kept in a password secured computer only accessible to primary researchers. Your name and student number will only be used to allocate SRPP points upon completion of the study and will not be stored with the data nor used in reports.

Questions

Should you have any questions about the study, please contact the following researchers:

Erin Lee Griqua: GRQERI001@myuct.ac.za

Zintle Wanda Mlomo: MLMZIN002@myuct.ac.za

Dr. Lea-Ann Pileggi (supervisor): lea-ann.pileggi@uct.ac.za; 021 650 3420

If you have any questions relating to your rights as a participant, comments or complaints about the study, please contact:

Rosalind Adams: Rosalind.Adams@uct.ac.za; 021 650 3417

Participant consent to participate in the study

I have read the informed consent form, the possible risks and benefits of participating in this study, and the part on voluntary participation. Therefore, I agree to participate in this study.

- I consent
- I do not consent

Appendix G

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

02 June 2020

Erin Griqua and Zintle Mlomo
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Erin and Zintle

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Establishing the reliability and validity of three questionnaire measures of empathy for the South African context.* The reference number is PSY2020-023.

I wish you all the best for your study.

Yours sincerely

Catherine Ward
Professor
Chair: Ethics Review Committee

Appendix H

Factor Analysis of the QCAE

Table 3

Factor loadings of the 5-factor Solution for the 31-item QCAE

	Components MR 1/Perspective-Taking	MR 2/ Emotional Contagion and Proximal Responsibility	MR 3 /Online Simulation	MR 4 Peripheral Responsibility	MR 5- 'unknown'
1. I sometimes find it difficult to see things from another's point of view.		-18	**.48**		.19
2. I am usually objective when I watch a film or play, and do not often get completely caught up in it.				**.55**	
3. I try to look at everybody's side of a disagreement before I make a decision.			**.50**		-.2
4. I sometimes try to understand my friends better by			**.56**		.12

	imagining how things look from their perspective.				
5.	When I am upset at someone, I will usually try to “put myself in the person’s shoes” for a while.		**.68**		
6.	Before criticizing somebody, I try to imagine how I would feel in their place.		**.59**	.14	
7.	I often get emotionally involved in my friends’ problems.	**.48**			.33
8.	I am inclined to get nervous when others around me seem nervous.	**.65**			
9.	People I am with have a strong influence on my mood.	**.60**			
10.	It affects me very much when one of my friends seems upset.	**.56**			.25
11.	I often get deeply involved with the	.24		**.60**	

feelings of a character in a film, play, or novel.					
12. I get very upset when I see someone cry.		**.45**		.17	.13
13. I am happy when I am with a cheerful group and sad when others are glum.		**.69**			
14. It worries me when others are worrying and panicky.		**.65**			
15. I can easily tell if someone else wants to enter into a conversation.	**.50**				-.15
16. I can quickly pick up if someone says one thing but means another.	**.68**				
17. It is hard for me to see why some things upset people so much.	.23		.20		.25
18. I find it easy to put myself in somebody else's shoes.	.13		**.61**		
19. I am good at predicting how	**.55**		.17		

someone will feel.				
20. I am quick to spot when someone in a group is feeling awkward or uncomfortable.	**.57**			
21. Other people tell me that I am good at understanding what others are feeling and what others are thinking.	**.50**	.13	.12	.30
22. I can easily tell if someone else is interested or bored with what I am saying.	**.47**			-.28
23. Friends talk to me about their problems as they say that I am very understanding.	**.40**		.10	.27
24. I can sense if I am intruding, even if the other person does not tell me.	**.44**			.-38
25. I can easily work out what another person might want to talk about.	**.67**			

26. I can tell if someone is masking their true emotion.	**.65**				
27. I am good at predicting what someone will do.	**.61**			-.11	
28. I can usually appreciate the other person's viewpoint, even if I do not agree with it.			**.40**	-.11	-.13
29. I usually stay emotionally detached when watching a film.				**.93**	
30. I always try to consider the other person's feelings before I do something.		.24	**.48**		
31. Before I do something, I try to consider how my friends will react to it.		**.38**	.22		

Appendix I

Factor Analysis of the IRI

Table 4

Factor loadings of the 4-factor Solution for the 28-item IRI

		Components MR 1/Emotional Contagion	MR 2/Personal Distress	MR 3/Fantasy Scale	M4/Perspective-Taking
1.	I daydream and fantasize, with some regularity, about things that might happen to me. (FS)		0.270	**0.283**	
2.	I often have tender, concerned feelings for people less fortunate than me. (EC)	**0.50**			0.12
3.	I sometimes find it difficult to see things from the "other guy's" point of view. (PT)		0.13		**0.40**
4.	Sometimes I don't feel very sorry for other people when they are having problems. (EC)	**0.46**			

5.	I really get involved with the feelings of the characters in a novel. (FS)				**0.70**
6.	In emergency situations, I feel apprehensive and ill-at-ease. (PD)	0.11	**0.55**	0.14	
7.	I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS)	0.16		**0.51**	-0.12
8.	I try to look at everybody's side of a disagreement before making a decision. (PT)				**0.69**
9.	When I see someone being taken advantage of, I feel kind of protective towards them. (EC)	**0.38**			0.16
10.	I sometimes feel helpless when I am in the middle of a very	0.14	**0.44**		

emotional situation. (PD)					
11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)	0.15				**0.63**
12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS)	0.14			**0.51**	
13. When I see someone get hurt, I tend to remain calm. (PD)	**0.36**				
14. Other people's misfortune do not usually disturb me a great deal. (EC)	**0.82**				
15. If I'm sure I'm right about something, I don't waste time listening to other people's arguments. (PT)	0.25				**0.28**
16. After seeing a play or	-0.11	-0.10			**0.40**

	movie, I have felt as though I were one of the characters. (FS)				
17.	Being in a tense emotional situation scares me. (PD)		**0.53**	0.13	-0.13
18.	When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC)	**0.66**			
19.	I am usually pretty effective in dealing with emergencies. (PD)			-0.16	
20.	I am often quite touched by the things I see happen. (EC)	**0.34**		0.23	0.14
21.	I believe that there are two sides to every question and try to look at them both. (PT)				0.61
22.	I would describe myself as a pretty soft-hearted person. (EC)	**0.41**	0.13	0.19	0.18

23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)	-0.13	**0.69**		
24. I tend to lose control during emergencies. (PD)	**0.71**			
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)				**0.58**
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)		**0.77**		
27. When I see someone who badly need help in an emergency, I go to pieces. (PD)	**0.48**			0.14
28. Before criticizing somebody, I try to imagine how				**0.40**

I would feel if I were in their place. (PT)