Personality and Individual Differences Psychology Interest Group

APS Australian Psychological Society

ACPID

Australian Conference on Personality and Individual Differences

Individual Differences: Implications for Research and Practice

Conference Proceedings

18 - 19 November 2016

A note from the Conference Chair

On behalf of the Understanding Personality Abilities and Individual Differences Research Team (unPAID-RT) from Monash University, it is my pleasure to welcome you to the Australian Conference on Personality and Individual Differences. The beachside suburb of St Kilda is a superb backdrop for another enjoyable and stimulating gathering of people with a passion for personality and individual differences psychology.

The theme for the conference is "*Individual differences: Implications for research and practice*". The challenge has been set for those presenting papers to consider the implications from both research and clinical perspectives. Even the most exotic and theoretical of topics can still have clinical relevance. Given the extent of the divide between research and practice in psychology, it is hoped that in some small way we can use this opportunity to highlight the implications for the individual through the study of individual differences.

Putting together a conference is a large task, and it couldn't be done without the support of a large number of people. For the many people in the team who assisted with planning, reviewing abstracts and papers, and helping to make the conference run smoothly, I am very grateful. In particular, Karen Bell and Carol Sandiford deserve a special mention, for securing a grant from the Monash Postgraduate Association to support the cost of the conference and enabling us to ensure that the conference remains accessible for students. For those who had organised previous conferences and freely offered all of their resources and advice. And most of all, I am grateful to my lovely wife Brigitte for her support and high level of trait organisation!

The abstracts included within these proceeding were subjected to blind peer review by the conference scientific committee. Full papers included in the proceedings were subjected to blind peer review for suitability and scientific rigour prior to publication.

Shane Costello

Conference Chair

Australian Conference on Personality and Individual Differences

Kate Jacobs PhD MAPS is an Educational and Developmental Psychologist and Lecturer in the Faculty of Education, Monash University. Kate's research interests centre around psycho-educational assessment practices, particularly those related to advancing knowledge surrounding the link between cognitive ability and academic achievement, as well as evidence-based assessment of specific learning disorders.

Improving cognitive assessments using Cattell-Horn-Carroll (CHC) theory (Keynote)

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Cattell-Horn-Carroll (CHC) theory is considered by many scholars within the intelligence field to provide the most accurate representation of the structure of human cognitive abilities currently available. This presentation will begin by providing an introduction to CHC theory, outlining recent changes to the model, and highlighting the importance of particular broad and narrow cognitive abilities within the model for both literacy and numeracy acquisition. It will then be explained how this theory is represented by previous and recently released editions of the Wechsler Intelligence Scale for Children (WISC) and Woodcock Johnson Tests of Cognitive Abilities (WJ COG). Examples of how researchers and practitioners can operationalise CHC in their work via use of either the WJ IV or a WISC V based cross-battery assessment will be provided.

Michal Kosinski PhD is an Assistant Professor and individual differences researcher at Stanford University's Graduate School of Business, and has previously held positions with Cambridge University and Microsoft. Michal coordinates the myPersonality project, which involves global collaboration between over 150 researchers, analyzing the detailed psycho-demographic profiles of over 8 million Facebook users. Michal's research focuses on the mechanisms linking psychological traits with a broad range of organizational and social outcomes, using a range of computational methods, including machine learning, data mining, and observational studies involving millions of participants.

Predicting personality from digital footprints (Keynote)

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Personality traits form a key driver behind people's behavior, cognitions, motivations, and emotions; therefore, assessing others' personality is a basic social skill and a crucial element of successful social interactions. However, based on a sample of over a million participants, I show that personality judgments made by computers—and based on generic and pervasive digital footprints (Facebook Likes)—are more accurate than those made by participants' friends, family members, and even romantic partners. Furthermore, compared with humans, computers achieve higher inter-judge agreement and superior external validity (i.e. are better at predicting life outcomes). In some cases, computer-based personality judgments are even more valid than self-reported personality scores. I conclude by discussing the consequences of computers outpacing humans in this basic social-cognitive skill.

John Roodenburg PhD FAPS is an Educational and Developmental Psychologist, Counselling Psychologist and Senior Lecturer in the Faculty of Education, Monash University. John is the course leader for the Master of Educational and Developmental Psychology program, Director of the Krongold Clinic, and National Chair of the College of Educational and Developmental Psychologists. John's research interests are primarily drawn from the study of cognitive style, psychological assessment and psychometrics.

Individual Differences: Challenges of sufficiency, scope, and clinical relevance (Keynote)

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Roodenburg challenges the sufficiency of abilities and personality in comprehensively capturing the domain of individual differences. Thinking is a fundamental to human existence: "I think therefore I am" Rene Descartes. We have historically understood the effect of differences in thinking content: "Nothing either good or bad but thinking makes it so" Hamlet - William Shakespeare; today seeking to effect well-being through changing content has given birth to an industry of cognitive therapy. Abilities capture our capacity and skill in thinking. Cognitive style has sought to capture individual differences in thinking, but with a plethora of models and no consensus on research epistemology, and despite being considered by Sternberg as a conflation of abilities and personality, it has gained little attention or acceptance within the individual differences research community.

To demonstrate valid scope for elucidating domains of individual differences beyond abilities and personality, Roodenburg goes on to consider how applying the methods that have given us the preeminent Cattel-Horn-Carol model of abilities and the Big-Five model of personality, now have the capacity to provide a validated foundation for developing new perspectives on individual differences. He demonstrates how this has been successfully applied directly to differentiating individual differences in ways of thinking.

The emerging model is examined in the context of the nomological net: the relationships between thinking styles with occupational interests, the Five Factor Model of personality, the Dark Triad, Mental Health, Resilience, and Well Being. While the clinical relevance of abilities has been more widely accepted, the relevance of personality for effecting well-being is less appreciated by practitioners. Variable centred perspectives of thinking style differences are extended by expanding research methodology into qualitative and mixed method designs, giving us more clinically relevant Person centred conceptualisations. The lesson can be transferred back to abilities and personality.

The session offers an engaging opportunity for delegates to gain first hand insights into their own individual ways of thinking.

Decision Making within Differing Contexts: Individual Difference and Group Dynamics (Symposium)

Marvin KH Law	The University of Sydney
Simon A Jackson	The University of Sydney
Eugene Aidman	Defence Science and Technology Group
Sabina Kleitman	The University of Sydney
Matthew D Blanchard	The University of Sydney

The aim of this symposium is to present findings from recent studies conducted within the University of Sydney, CODES laboratory. These studies investigate the relationships between decision making processes and individual difference factors such as personality, cognitive performance and metacognitive factors.

It's the Deceiver, not the Receiver: No individual differences when detecting deception in a foreign language

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Lie detection researchers contend whether individual differences in lie detection exist. Bond & DePaulo's meta-analysis found variance in judge (receiver) characteristics was lower than variance in sender (deceiver) characteristics. However, in all studies examined, judges were able to understand senders. The current study extends previous work by removing language comprehension from lie detection stimuli presented in video-and- audio modalities, about emotional and non-emotional content. English-speaking participants (N=126) judged the veracity of German speakers in a lie detection task. Other individual differences measures were assessed: intelligence (General, Auditory and Emotional) and personality (Dark Triads and Big 6). Findings suggest that removing language comprehension did not reveal stronger individual differences in judge ability. Overall, the results replicated Bond & DePaulo's findings. There was, however, a small but significant positive correlation between judge ability scores towards lying senders and truth-telling senders. It is recommended that lie detection research should place a larger focus on sender characteristics.

Group effects on confidence and decision making

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Group decision-making is an integral function of everyday life. Understanding its benefits and pitfalls is therefore critical for improving outcomes in many domains (e.g., medical, military, and business). The preliminary aim of this research was to therefore investigate the effects of group interaction on cognitive performance, metacognitive confidence, and decision making. Extending prior research, a further aim was to examine whether these effects related to the types of individuals working together. Undergraduate students (N = 120) completed a general knowledge test as individuals and then together with a dyad partner. Each question was accompanied by a confidence rating and a decision to bet $10 on the answer. Participants also completed two cognitive tests, also accompanied by confidence ratings and bet decisions, and a personality questionnaire. Preliminary results indicate no difference in general knowledge accuracy when the test was completed as individuals or dyads. However, participants were significantly more confident, decisive (made more bets) and reckless (lost more bets) when working in a dyad than individually. Regarding our second aim, the results also indicated that these changes increased as the mean trait-confidence of the dyad members increased. That is, high-confidence individuals became even more confident, decisive and reckless when working together, than low trait-confidence individuals working together. The implications of these findings are that individual trait-confidence may guide the formation of more effective groups.

Assessing adaptability using sim-embedded metrics and novel visualization techniques

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We will present a VR simulation for assessing people's adaptability when working in teams. The simulation involves emergency-vehicle training. One person is a trainee emergency vehicle driver. They will be confronted with challenges requiring them to adapt their cognition and behaviour in order to successfully accomplish the task. A teammate is seated in a command centre and has control over the camera mounted to a drone orbiting the city. The drone operator can freely communicate with the driver to warn them of upcoming challenges such as road blocks or changes in traffic density. The simulation is intended to address a number of capabilities surrounding human cognitive performance in applied settings. These immediately include the capacity to research and understand adaptability. Future capabilities will include the ability to select and prepare adaptive individuals to make

effective decisions in challenging conditions, as well as the ability to augment the formation and preparation of effective teams. This will be made possible via the carefully controlled, but seemingly free flowing, game play. Simulation-embedded metrics allow us to capture individual differences in cognitive and metacognitive constructs featured in adaptability. The combination of this simulation, and those that follow, with real-time performance analysis using Bayesian algorithm will be discussed as an avenue by which cognitive performance enhancement may be realised more rapidly. A live demonstration of the example of simulation scenario will be presented.

Individual differences in susceptibility to online phishing

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Phishing is a form of deception in which an attacker attempts to fraudulently acquire sensitive information from a victim by impersonating a trustworthy entity (Jagatic, Jonhson, Jakobsson, & Menczer, 2007, p 1). Perceived as an easier and more successful alternative to technical security infiltration, online phishing has grown in popularity, consisting of 20% of online threats within 2014. It is vital to examine the individual difference variables which relate to phishing vulnerability to address future security risk. To determine individual differences in susceptibility to online phishing, a reliable measure must be developed. A pilot study was conducted with 150 university students from the University of Sydney who received partial course credit. Variables of intelligence (Gf and Gc), personality (Big 6), phishing knowledge and online behaviour were also measured. Preliminary results indicated that the newly designed measure captures two broad factors: susceptibility to online phishing and ability to detect genuine emails, with each having robust internal consistency estimates (alphas > .80). They shared meaningful relationships with perceived email maliciousness, intelligence and knowledge of phishing.

Understanding individual differences in cognition through the lens of personality: the role of traits from the Openness/Intellect spectrum (Symposium)

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Anna Antinori	The University of Melbourne
Kate A. Barford	The University of Melbourne
Margaret B. Webb	The University of Melbourne
Luke D. Smillie	The University of Melbourne

Cognitive processes have often been considered to be largely independent of personality. Indeed, personality is sometimes referred to as comprising “non-cognitive traits”. Yet, personality traits have been linked with a range of cognitive processes from attention bias (anxiety) to perspective taking (agreeableness) to working memory (intellect). These links seem most pronounced for the various traits that fall under the broad umbrella of the Openness/Intellect domain. This realisation has opened up many new and exciting research opportunities concerning individual differences in cognition, and how these differences are influenced by personality. The speakers in this symposium will present on their recent research concerning differences in (a) the tendency to perceive different kinds of semantic content as profound (Bainbridge), (b) perceptual suppression during binocular rivalry (Antinori), (c) conflicting appraisals of visual arts stimuli (Barford), and (d) differences in problem solving and the experience of insight (Webb). The symposium will then conclude with a brief summary (Smillie).

Seeing it both ways: Openness to Experience and Binocular Rivalry Suppression

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Openness to experience is characterised by flexible and inclusive cognition. Here we investigated whether the ability of open people to see more possibilities extends to basic visual perception, resulting in seeing more possibilities literally rather than metaphorically. To test this we used binocular rivalry, where the brain alternates between perceptual solutions and times where neither solution is fully suppressed (mixed percept). In Study 1 we showed how those high in openness perceive more instnaces of mixedpercept, a finding replicated in Study 3. In Study 2 we then showed how a mood manipulation characterised by perceptual-aesthetic component, to which open people are particularly susceptible, increased the quantity of reported mixed percept. Finally, in Study 3 by using stimulus conditions known to increase the contribution of low-level cortical properties on the mixed state, we ruled out that the relation between mixed percept and openness was caused by open people having different response criteria.

Traits from the Openness/Intellect spectrum predict success or failure to discriminate bullshit from the profound

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DeYoung, Grazioplene & Peterson (2012) demonstrated that traits within the Openness/Intellect spectrum form a paradoxical simplex from intelligence to apophenia (or positive schizotypy). Conceptually similar trait constructs were shown by Pennycook, Cheyne, Barr, Koehler & Fugelsang (2015) to predict profundity ratings of "pseudo-profound bullshit" (i.e., syntactically sound but meaningless statements). We examined whether differences in profundity ratings for pseudo-profound bullshit were due to discrimination or response bias, and whether the Openness/Intellect spectrum captured individual differences in these processes. Participants (N = 142 University of Melbourne psychology undergraduates) completed measures of traits from the Openness/Intellect spectrum, tests of cognitive ability and reflective thinking, measures indicating apophenic tendencies, and also provided profoundness ratings of several types of statements (including pseudo-profound bullshit). Results suggested that the tendency to rate pseudo-profound bullshit as profound was due to deficits discriminating the profound from the vacuous, rather than a bias toward rating all statements as profound. Traits toward the intelligence/intellect end of the Openness/Intellect spectrum positively predicted discrimination, while traits toward the apophenia end of the spectrum negatively predicted discrimination. Implications for personality and receptivity to pseudo-profound bullshit are considered.

Problem solving a matter of intellect but not openness: Investigations of openness/intellect and insight problem solving

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DeYoung et al. (2012) outline a theory in which traits within the Openness/Intellect domain form a paradoxical simplex, with the tendency to perceive patterns in noise (apophenia) and the ability to deduce meaningful solutions (intelligence) being negatively correlated but loading on Openness/Intellect. Here we investigated whether intelligence or unusual experiences (a subscale of schizotypy which reflects apophenia) individually predicts problem solving in insight-type problems across three experiments (total N = 403). In studies one to three, participants were presented with a measure of schizotypy (O-LIFE; Mason, Linney, & Claridge, 2005), the big five (mini-IPIP; Donnellan, Oswald, Baird, & Lucas, 2006), divergent and convergent thinking tasks, insight problems, and non-insight problems. In

Study 1, we demonstrated a relationship between measures of convergent thinking and problem solving, a finding that was replicated in Study 2. However, there was no evidence for a relationship between schizotypy, or openness and the ability to solve insight problems in any dataset. These results represent a robust disconfirmation of previous links between schizotypy and insight problem solving, and suggest that intellect is more important than openness in problem solving.

Personality and conflicting evaluations of aesthetic stimuli: Openness/Intellect predicts mixed-valence appraisals of art

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Appraisal theorists have recently proposed that appraisals of conflicting valence may underpin mixed emotions (i.e., simultaneous feelings of positive and negative valence). Although no study has investigated individual differences in the experience of mixed valenced appraisals, we recently demonstrated that the Openness aspect of the Openness/Intellect trait domain positively predicts dispositional mixed emotions (Barford & Smillie, 2016). Thus, in the present study, we hypothesised that Openness would positively predict mixed appraisals. Participants (N= 225, 69.3% female) appraised a series of 18 visual art pieces and scores on three types of mixed appraisals were calculated: Knowledge-Negative, Pleasing-Upsetting, and Beautiful-Disgusting. Multilevel modelling was used to analyze the data (art pieces clustered within individuals). Results showed that 1) Openness/Intellect positively predicted all three types of mixed appraisals 2) For all three appraisal types, Higher scorers on the Openness aspect of Openness/Intellect were more likely to rate an image as more mixed if the image was rated as more mixed by participants on average 3) Higher scorers on Openness/Intellect were more likely to rate an image as more mixed if they viewed the image for longer for Knowledge-Negative and Pleasing-Upsetting appraisal types, and this was specific to the Intellect aspect of Openness/Intellect for mixed Knowledge-Negative appraisals. Additional unpredicted findings for Neuroticism will also be discussed. Overall, our findings support Openness as the major trait underlying susceptibility to mixed valenced appraisals of art.

Using technology in dark ways: How Dark Tetrad variables manifest online (Symposium)

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Rachel Grieve	Department of Psychology, University of Tasmania
Melissa Smoker	School of Health Sciences and Psychology, Federation University
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Over 3.2 billion people around the world actively access the Internet daily to engage in personal, social and business interactions. With the increase of communication and socialising carried out through social networking sites and platforms, the Internet has become an extension of our face-to-face social world. However, although the Internet offers new opportunities to socially engage with others, new and diverse versions of face-to-face antisocial behaviours and misconducts have also emerged online. Research has considered specific predictive variables of these antisocial behaviours, paying particular attention to personality traits. The domain of dark personality traits is an area of investigation particularly relating to interpersonal online misconduct. The current symposium presents four papers that explore the utility of the Dark Tetrad in predicting online antisocial and self-promotional behaviour. The Dark Tetrad personality traits are a constellation of four distinctive socially malicious traits: Machiavellianism, narcissism, psychopathy and sadism. All four of the dark tetrad traits have been associated with a number of self-promoting and antisocial behaviours. The studies included here all explored variables of the Dark Tetrad in relation to online social media behaviours. These behaviours included: Intimate partner cyberstalking, harassing others on Location Based Real Time Dating (LBRTD) applications, such as Tinder; taking and posting selfies; and using the ephemeral communication app Snapchat. Variables of the Dark Tetrad (in addition to other variables explored) were found to have utility in predicting some online antisocial and self-promotional behaviour. These studies contribute to the growing body of research exploring “the dark side” of technology.

"By the way, which is my best side?" Self-esteem moderating the association between narcissism and selfie behaviour

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A selfie is defined as a self-portrait taken with a hand-held smart phone or camera, and statistics show over a million selfies are taken a day. Although still in its infancy, contemporary research has begun to explore predictors of "selfie" behaviour. Predominantly, research has explored how gender and narcissism predict the number of selfies posted on social media. The current study sought to extend this research by exploring gender, subtypes of narcissism (Leadership/Authority, Grandiose Exhibitionism, and Entitlement/Exploitative), individual self-esteem, and selfie behaviour (selfies taken and selfies posted). Participants (N = 257; 22% men and 78% women) with a mean age of 30.45 years (*SD* = 10.87) completed an online questionnaire including the NPI-40, the Rosenberg Self-Esteem Scale, and questions regarding selfie behaviour. Results showed that women were more likely than men to take and post selfies. Furthermore, Grandiose Exhibitionism narcissism positively predicted selfies posted, whereas self-esteem negatively predicted selfies taken and posted. For selfies taken, adaptive (Leadership/Authority) narcissism was a significant positive predictor. Considering this narcissistic subtype is only predictive of taking selfies, not posting selfies, the adaptive element of this type may act as a buffer for engaging in heightened online self-promotion. Finally, a moderation analysis found that self-esteem moderated the relationship between Grandiose Exhibitionism narcissism and taking and posting selfies; however, this moderation only occurs for low and average levels of self-esteem. Results of the current study significantly contribute towards understanding the association between selfies and narcissism, showing that this relationship may actually be moderated by an individual's self-esteem.

Enmity and amity: The role of 'dark' traits in the transience of Snapchat

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Snapchat is an instant messaging application that allows users to send pictures ("snaps") in the form of photos or videos to other Snapchat users on their mobile devices. The key feature of Snapchat is that (unlike traditional SMS-based photomessaging) Snapchat content is automatically deleted from both the sender's and receiver's device within a matter of seconds. However, snap recipients are able to save snaps (for example taking a screenshot or using another device). Consequently, there is inherent capacity for Snapchat to be used in malicious ways a snap with explicit or embarrassing content might be sent under the assumption that it will not be recorded, but the receiver might breach this implicit contract. Under this premise, the aim of this study was to explore the role of the dark aspects of personality in Snapchat users' snapsaving. Participants (N=184) completed measures of the Dark Triad traits and sadism, reported their Snap saving behaviour, and answered an open-

ended question about what they did with saved snaps. A multiple regression model had a medium effect size (f^2=.17), and greater psychopathy was significantly associated with snapsaving. Qualitative data were explored using VOSviewer. Network analysis showed a simple pattern of motivations for higher psychopathy individuals, with a core of perceived funniness and embarrassment. However, a more complex pattern of results for individuals reporting lower psychopathy levels emerged, with snapsaving considered to be indicative of affiliation. These findings inform understanding of personality and social interaction in the context of ephemeral online communication.

Gender, the Dark Tetrad, and intimate partner cyberstalking: 99 problems and she is statistically likely to be one

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Stalking behaviours performed against former and current intimate partners account for the majority of reported stalking situations, are continuously increasing, and can result in physical, psychological, and financial distress. However, the literature indicates a lack of clarity regarding perpetration of relationship stalking behaviour. Further, the rise of technology has led to increased access to personal information and thus has facilitated the ease of stalking an intimate partner online (i.e., cyberstalking). As "dark" personality traits have previously been linked to online antisocial behaviour, the aim of the current study was to examine the utility of gender and the Dark Tetrad traits (Machiavellianism, psychopathy, narcissism, and sadism) in predicting perpetration of intimate partner cyberstalking. A sample of 689 (30% men, 70% women) between the ages of 18 and 74 years (*M* = 26.64, *SD* = 10.21) completed an online questionnaire consisting of the Short Dark Triad, the Short Sadistic Impulse Scale, and a measure of engagement in intimate partner cyberstalking. Results showed that gender was a significant predictor, with women being more likely to engage in intimate partner cyberstalking. Additionally, all Dark Tetrad traits were found to be significant predictors of intimate partner cyberstalking. Identification of factors that influence individuals to engage in intimate partner cyberstalking could be beneficial in cyberstalking interventions. Furthermore, the current study has formulated a quantitative analysis of intimate partner cyberstalking (i.e., the Intimate Partner Cyberstalking Scale; IPCS) that can be used in future research exploring partner stalking online.

It's a match? Exploring self-promotional and antisocial behaviours on dating applications

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The online environment is frequently used to interact with others and establish new relationships, and over the past decade online dating has become increasingly popular. Online dating is often associated with increased self-promotional and antisocial behaviours, and research has linked these behaviours to both individual narcissism and self-esteem. In addition, research has also established men are more likely to engage in antisocial behaviours, whereas women are more likely to engage in self-promotional behaviours. The current study aimed to extend previous research on online dating by examining, for the first time, the utility of self-esteem and subtypes of narcissism in predicting self-promotional (including provocative) and antisocial behaviours on dating applications designed specifically for smartphones (e.g., Tinder). Participants (N = 1,244; 48% men, 52% women) had a mean age of 22.79 years (*SD* = 5.77), and completed an online questionnaire which included a narcissism scale, a self-esteem scale, and questions regarding their dating application behaviours (i.e., self-promotional and antisocial behaviours). Results showed that men and exhibitionism narcissism positively predicted self-promotional behaviours on these dating applications. Exhibitionism narcissism was also found to positively predict self-provocative behaviours. In addition, men and entitlement/exploitative narcissism positively predicted antisocial behaviours on LBRTD Applications. However, self-esteem did not predict self-promotional or antisocial behaviour. These results elucidate the mating strategies (e.g., self-promotion) that men and women may employ to maximise their dating success online. In addition, understanding predictors of aggressive and harassing (i.e., antisocial) behaviours on these dating applications can help to both educate and protect victims of this behaviour.

Self-efficacy and the Confidence trait, their antecedents and role in educational achievement and wellbeing (Symposium)

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Jihyun Lee	School of Education, University of New South Wales
Iain Crossing & Sabina Kleitman	School of Psychology, The University of Sydney
Karina Mak & Sabina Kleitman	School of Psychology, The University of Sydney

The Confidence trait is assessed using on-task confidence judgments collected during test-taking. Confidence reflects a metacognitive monitoring process and is the best non-cognitive predictor of a wide range of achievement markers. Evidence is growing that Confidence also plays an important role in determining the actions that are taken once a decision has been made. This symposium presents findings from recent studies conducted in Australia at The University of Sydney, Australian Catholic University and University of New South Wales and Singapore. These studies have examined the relationship between individuals confidence in their response accuracy to cognitive test items, measures of intelligence, self-efficacy, educational achievement and wellbeing. Various measures of parental rearing styles, self-beliefs and personality were also utilised.

Individual differences in the impostor phenomenon and its relationship with the confidence trait

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The impostor phenomenon is a psychological experience of intellectual and professional fraudulence (Clance & Imes, 1978). It is associated with lowered wellbeing, pervasive self-doubt, uncertainty in self-image and characterised by a misalignment in self-assessments about one's ability with actual performance. Despite the mismatch between self-evaluations and actual performance, limited research has examined the impostor phenomenon with metacognitive processes such as self-confidence and objectively measured ability. Preliminary results from the present study involving undergraduate students from The University of Sydney indicate high impostorism feelings were significantly associated with lower self-concept clarity, lower self-esteem and lower wellbeing. High impostorism feelings also significantly predicted lower confidence on cognitive ability tasks, however, it did not predict actual performance. These preliminary results support the nature of the impostor phenomenon that emphasises a misalignment between self-assessments of one's performance with actual task achievements. The broad implications for academic and organisational psychology are discussed alongside its impact on health and social issues.

Revisiting "No Man's Land" between abilities and personality

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Almost 20 years ago I wrote a chapter for a book based on a conference organized by the US military (Stankov, 1999). Some of our empirical work was starting to look at the non-cognitive predictors of performance on tests of achievement and ability. Two constructs were the focus of this chapter. First, I reported on our just-published findings with measures of emotional intelligence. I haven't studied that construct ever since. Second, I summarized findings from several studies that employed measures of confidence. That work was continued both by my students (e.g., Kleitman, Pallier) and myself at the ETS and in Singapore where I had the opportunity to learn more about the work of educational psychologists whose focus was on a set of constructs that can be labelled self-beliefs. Due to their use in questionnaires that accompany large-scale international studies (i.e., PISA and TIMSS), we now know that self-efficacy and anxiety are good predictors of, say, mathematics achievement. On the other hand, predictive validity of the now popular self-concept is on the borderline of being useful. Confidence was not a part of PISA and TIMSS but was used, together with measures of the same self-beliefs, in several of our own studies in Singapore. It proved to be the best non-cognitive predictor of achievement. I shall summarize some of the most recent work with self-beliefs measures and mention the links between self-beliefs, decision-making, metacognitive processes and mental toughness. I see self-beliefs as impediments (anxiety) or facilitators (good calibration of self-efficacy and confidence).

Non-cognitive predictors and self-beliefs in student achievement

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This presentation will start with a review of non-cognitive constructs that have been measured in recent large-scale international student assessments, PISA and TIMSS. The constructs in these assessments were selected in collaboration with the participant nations (more than 60 countries) as having relevance and applicability to each educational system. The constructs are typically chosen in the context of learning specific academic domains - mainly for reading, mathematics, and science. In spite of the rigorous process employed in the construct selection, the empirical evidence based on various types of correlational analyses and related statistics (e.g., hierarchical linear modelling) show that most of these constructs do not have linear relationships to students' academic achievement in reading, mathematics, and science. The only psychological constructs that show consistent moderate correlations with achievement are students' self-beliefs related to their academic work (self-efficacy, anxiety and self-concept). The results are replicated in different cycles of PISA as well as between the PISA and TIMSS surveys.

Individual differences in confidence and decision-making tendency: The role of parenting, ethnicity, and self-concept

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Studies investigating sex and ethnicity differences in confidence have produced findings of varying conclusiveness. For example, higher male than female overconfidence bias has been replicated with small effect sizes in several studies but not in others. Cultural differences in confidence and bias have also been shown to be small. However, the etiology of individual differences (including sex differences and cultural / ethnicity differences) in confidence or bias has received less attention in the literature. Self-beliefs, feedback, motivation have been implicated as possible antecedents of confidence and bias. Parenting style is a significant source of difference in socialisation experiences between sexes and between cultures and it has strong relationship with self-beliefs. A small number of studies have demonstrated a weak direct relationship between parenting styles and confidence. This study in progress (N = 260 currently) is the first to include an expanded range of measures in order to test the hypothesis of a relationship between parenting styles and confidence mediated by self-concepts. Preliminary path analytical results indicate model heterogeneity between ethnic groups and between the sexes. The findings will be discussed in relation to possible applications in the training of decision making styles and metacognitive skills.

Personality and Wellbeing (Symposium)

Luke D. Smillie	University of Melbourne
Rowan Jacques-Hamilton	University of Melbourne
Kun Zhao	University of Melbourne
Margaret L. Kern	University of Melbourne

There are strong individual differences in wellbeing: some people have a tendency to be more consistently "happy" than others. A fundamental motivation for research in psychology, and in other disciplines, is to identify what processes underlie these individual differences, and how this information can inform efforts to improve wellbeing. Theory and research in personality psychology has much to offer this topic, as personality traits are among the strongest predictors of wellbeing (Steel, Schmidt & Shultz, 2008). In this symposium, we will discuss how individual differences in big five traits and aspects are related to consequential components of wellbeing. We will present findings that distinct aspects of personality can predict wellbeing outcomes, and discuss whether enacting "personality states" (i.e. acting extraverted) is "good for you". Finally, we will discuss why a longer-term consideration of wellbeing is necessary, drawing from research on conscientiousness.

Aspects of Agreeableness differentially predict social decision making in economic games

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One important component of wellbeing is our capacity to form and maintain interpersonal connections with others. Recent developments in personality psychology have identified two "aspects" of compassion (i.e., empathic and emotional concern for others) and politeness (i.e., good manners and adherence to social norms), which are together subsumed within the broad trait domain of Big Five agreeableness (Deyoung, Quilty, & Peterson, 2007). Although both contribute to interpersonal harmony, emerging research suggests that the two aspects diverge from one another in terms of their biological substrates and with respect to moral values and political ideology. Adding to this literature, we test these predictions from personality psychology using social decision-making paradigms from experimental economics. We present a series of studies among Australian and U.S. participants examining how politeness and compassion differentially predict social decisions, specifically, fair distributions of wealth in the dictator game and punishment and recompensation in third party games (Zhao, Ferguson, & Smillie, 2016). These findings highlight the discriminant validity between similar interpersonal constructs and have broader implications for understanding the multidimensional structure of prosociality.

Mapping the Big Five personality aspects to multiple dimensions of well-being

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Personality traits are robustly associated with measures of well-being, but the exact correlates differ depending on the level of the personality hierarchy and the specific well-being constructs under consideration. To date, no research has examined the unique associations between the recently-discovered "aspects" of the Big Five personality domains and a comprehensive range of well-being outcomes. Two samples of U.S. participants ($N_{Sample1}$ = 205; $N_{Sample2}$ = 507) completed measures of the Big Five Aspects, subjective well-being, psychological well-being, and PERMA well-being. Semipartial correlations revealed that one aspect within each Big Five domain (controlling for the non-focal aspect) was more strongly associated with well-being in both samples. In the combined sample, path analysis revealed robust associations of Enthusiasm and Withdrawal with a range of well-being variables, as well as several more idiosyncratic correlations between other personality aspects and well-being (e.g., Compassion with Positive Relations, Industriousness with Accomplishment, and Intellect with Engagement). Our findings suggest that an aspect-level analysis provides a satisfactory balance between the goals of parsimony and comprehensiveness when describing the relation between basic personality traits and measures of well-being.

The consequences of acting more Extraverted: A randomised controlled trial

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Recent research demonstrates that extraverted behaviour is linked with increased positive affect (PA), prompting suggestions that acting more extraverted could benefit wellbeing. However, possible negative consequences of acting extraverted have not been thoroughly addressed. We aimed to investigate whether acting more extraverted is "good for you" by implementing the first "act extraverted" randomised controlled trial. A key research interest was whether the consequences of the intervention differed for "extraverts" and "introverts". Participants (n = 90) were randomly assigned to carry out "act-extraverted" or "sham" instructions for one week in everyday life. Effects of the intervention on wellbeing outcomes, including PA, feelings of authenticity, and tiredness, were examined. Outcomes were also assessed post-intervention and at a 2-week follow-up. We found that the act-extraverted intervention increased PA and authenticity for participants above-average on trait extraversion. For participants lower on trait extraversion, the benefits for PA were less

clear, and there was no benefit to authenticity. The only negative consequences of the intervention were for extreme introverts, who experienced reduced authenticity, and no intervention effects persisted to follow-up. These findings supported the notion that acting extraverted can benefit wellbeing for extraverts, but whether this is so for introverts remains unclear. Further research should attempt to replicate these findings with higher power, and consider alternate implementations of an act-extraverted intervention, aimed at making the intervention more accessible and beneficial for introverts.

Industriousness and wellbeing: A balanced perspective

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This talk will consider implications of industriousness, an aspect of conscientiousness, on wellbeing, particularly as it applies to education. Positive education is a relatively new sub discipline that emphasizes the importance of both academic achievement and wellbeing. While offering numerous strategies for building and supporting student and teacher wellbeing, it can also lead to an attitude in students and parents that shies away from challenge. Yet some of the greatest accomplishments come from persevering through trials, even though wellbeing may be compromised at the time.

Industriousness includes persevering through challenge, working hard, high motivation towards achievement, and avoiding distraction. It is an important predictor of higher levels of achievement across multiple domains. At the same time, some students have too much industriousness. They become our highest achievers, but they are also experiencing high levels of stress, resulting in psychological disorders.

When considered in light of lifespan prospective studies, a long-term perspective on the relationship between individual characteristics and wellbeing is needed. While many positive psychology interventions focus on short-term benefit, it is the delay in gratification that often leads to the greatest benefit. This must be tempered with the wisdom to know when it is best to push forward and when is best to back off. By combining evidence from both long and big data, this talk will suggest a balanced perspective toward applying individual characteristics within school.

When is the Full Scale Intelligence Quotient (FSIQ) valid: Under what conditions and for who?

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Historically, giftedness and intellectual disability (ID) are two conditions in which a full scale intelligence quotient (FSIQ) score has been the predominant means of identification and diagnosis. Thus the FSIQ regularly acts as the gateway to the provision of additional resources and support. However, the move from conceptualising and testing intelligence as a single general ability towards measuring and understanding an individual's profile of cognitive strengths and weaknesses has resulted in considerable debate as to whether the FSIQ is a valid indicator of intelligence, particuarly in the presence of cognitive profile variability. Much of the previous research has been conducted with intelligence test batteries that have been developed atheoretically and do not sufficiently approximate the full range of cognitive abilities that contribute to intelligence, as prescribed by the Cattell-Horn-Carroll (CHC) model of cognitive abilities; the most accurate representation of the structure of human cognitive abioities currently available. Additionally, different methodologies and statistical analyses are employed by researchers, often depending on which side of this debate the researcher is situated. This presentation will provide an overview of the extant empirical research in this area, identifying gaps and limitations that have limited the conclusions that have been able to be drawn to this point. Suggestions and avenues for future research will then be highlightred, along with implications for clinical practice.

Emotional intelligence affects emotions through the appraisal process

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Emotional intelligence (EI) is the ability to perceive, use, understand and manage emotions. Theories of emotion, emotion regulation, and coping hold that appraisals (e.g., personal relevance, controllability, fairness) generate emotions as well as the emotion regulation strategies. The current research examines whether EI is associated with situational appraisals, whether EI moderates the effect of appraisals on emotions and emotion regulation, and whether appraisals mediate the known relationships of EI with both regulatory strategies and the experience of positive and negative affect. These links are tested with multiple paradigms, including experience sampling (N = 179), the day reconstruction method (N = 181) and text-based vignettes (N = 105).

The psychometric properties of the General Reasoning Test 2 in an Australian sample

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The General Reasoning Test 2 (GRT2) is cognitive ability test used mainly in the assessment of job applicants. This test was created in the United Kingdom and has demonstrated good psychometric properties in that population. However, the psychometric properties of this test within the Australian population have yet to be thoroughly investigated. This test has been used in Australia since 1993 and administered to hundreds of thousands of job applicants in this country as part of the selection process for employment. It is therefore important to understand the structure of the test, and the impact of factors such as sex and age on test scores, both from a practical and theoretical point of view. This study used ESEM and CFA to investigate the factor structure of the GRT2 as well as sex and age differences. EFA results indicated a two-factor (Gf/Gc) structure for the GRT2, and this was supported by subsequent CFA. Some differences across sex and age in latent means and in specific items were identified. Practical implications for the interpretation and utilization of test results at the individual level, as well as theoretical implications in terms of test structure and sex and age differences in cognitive abilities will be considered.

How Extraversion influences soft and hard skills?

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The existing research has established the association between personality traits and emotional intelligence. A sample of 195 students was used to test the influence of Extraversion on hard and soft skills. Specifically, emotional intelligence was considered as a soft skill and cognitive flexibility as a hard skill. Extraversion and EI were measured using self-report scales and cognitive flexibility was measured by a laboratory- based Attention Control Scale and a Cognitive flexibility test. The experimental study revealed that Extraversion was strongly associated with soft skills when compared to hard skills. Interestingly, soft skill was not positively associated with hard skills. Overall, the results suggest that Extraverts are stronger in soft skills compared to hard skills. These findings have important implications, specifically in relation to personality traits and workplace productivity.

Associations between verbal and visuo-spatial working memory and academic performance in early school-aged children: A population-based study

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Objectives: To investigate the pattern of associations between visuo-spatial and verbal working memory, and academics, specifically word reading and mathematics, across the early school years in a longitudinal population cohort. It was expected that at Grade 3 (8-9 years): (i) verbal compared with visuo-spatial working memory at Grade 3 and 1 would be more strongly associated with word reading, while (ii) visuo-spatial compared with verbal working memory at Grade 3 and 1 would be more strongly associated with mathematics performance. Given mathematics performance predicts word reading, mediation models examining the role of working memory aspects in this association were tested.

Method: Design: Population-based longitudinal cohort study of 1266 children attending 44 randomly-selected primary schools in Melbourne, Australia. Measures: In Grade 1 and 3, verbal and visuo-spatial working memory were assessed by Backward Digit Span and Mr X subtests, Automated Working Memory Assessment. In Grade 3, academic performance was assessed by Word Reading and Math Computation subtests, Wide Range Achievement Test – Fourth Edition.

Results: For Word Reading at Grade 3, verbal working memory at Grade 3 ($b=.26$ $p<.01$) and Grade 1 ($b=.32$, $p<.01$) contributed more strongly than visuo-spatial working memory at Grade 3 ($b=.13$, $p<.01$) and Grade 1 ($b=.06$, $p=.011$), respectively. For Math Computation at Grade 3, verbal working memory at Grade 3 ($b=.33$ $p<.01$) and Grade 1 ($b=.33$, $p<.01$) contributed more strongly than visuo-spatial working memory at Grade 3 ($b=.23$, $p<.01$) and Grade 1 ($b=.18$, $p<.01$), respectively. Verbal and visuo-spatial working memory were important partial mediators of the effect of mathematics performance on word reading at Grade 3. Here, mathematics performance explained more variance than working memory in word reading.

Conclusion: Findings highlight a particularly important role for verbal working memory in academic performance across the early school years. Screening early school-age children for verbal working memory difficulties and implementing interventions enhancing a combination of verbal working memory and the target skill for improvement could help to enhance their academic performance.

Assessment of the interpersonal skills of potential doctors: their inclusion in the selection processes of medical and health science courses

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Students wishing to gain entrance to medical courses in Australia and New Zealand are required to sit the Undergraduate Medicine and Health Sciences Admission Test (UMAT). The extent to which we need to consider interpersonal skills when selecting students into medical and health science courses is often debated and the focus of this Mixed Methods research study is the Understanding People section of the UMAT which claims to assess interpersonal skills. In the first part of the research study, an investigation of the construct validity of UMAT Understanding People was conducted on a sample of 301 UMAT candidates using both ability and self-report measures of emotional intelligence and a measure of verbal reasoning. Results show that there is relationship between scores on a measure of ability Emotional Intelligence and scores on UMAT Understanding People. Verbal Reasoning was found to partially mediate the relationship between ability emotional intelligence scores and UMAT Understanding People scores. An analysis of a sample of practicing doctors' attitudes to this section of UMAT comprises Part 2 of the research study. While a content analysis is still underway, the data show that the importance which practicing doctors placed on interpersonal understanding appears to be related to their area of specialty and that there are diverse opinions as to the worth of its inclusion in a test for entrance to medical courses.

A quantitative exploration of childrens' thinking and personality

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What is it about the culmination of innate individual characteristics that distinguish us from others, yet simultaneously captures the similarities we share? Are personality descriptors, captured by predominant instruments sufficiently comprehensive in explaining all the innate factors as to why some people behave differently? Does personality adequately include differences in thinking, or can a more nuanced understanding of the ways we think contribute something significantly more to our understanding of individual differences? This study aimed to investigate the relationships of thinking styles (Surgency, Creative, Control, Intuitive, Freethinking, and Scientific) that underlie personality factors and facets of Extraversion, Emotional Stability, Imagination, Benevolence, and Conscientiousness—derived from the Five-Factor Model—that emerge in Australian children. Participants, parents of children aged between 9 and 12 years, completed an online survey about their perceptions of their child's personality using the Hierarchical Personality Inventory for Children – Australian version (HiPIC-A) and ways of thinking using the Children's Ways of Thinking survey (C-WOT). Surgent thinking was revealed to underlie all Extraversion, Imagination, and Conscientiousness factors and facets whilst Creative thinking was associated to both negative and positive aspects of Emotional Stability and the Creativity facet of Imagination. A strong negative relationship was revealed between Controlled thinking and Imagination. Further, Freethinking was found to be associated with Benevolence and all constituent facets. This initial exploratory study has immediate implications for professionals working with children, such as psychologists, educators, and counsellors. The results also support further research around style-relevant cognitive tasks to examine whether correlation can extend to causation between personality and thinking styles.

On dreams and dopamine: assessing the role of motivation in dreams

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The merits of Freudian dream theory continue to be debated and both supporters and critics appeal to empirical evidence to support their respective positions. What receives much less attention is the theoretical coherency of either Freudian dream theory or alternative perspectives. This paper examines Freudian dream theory and J. Allan Hobson's alternative position by addressing the role of motivation in dreams. This paper first discusses motivation in Freudian theory and its relation to dreams and disguise-censorship. The role of motivation in Hobson's theory is then considered. Hobson's claim that dream plot and content selection is random and based on design error and functional imbalance is then discussed in relation to his hypothesis that dreams provide environments for skill rehearsal. Suggestions for integrating motivation into Hobson's account are developed and implications for clinical practice further considered.

Personality differences and political orientation in cat people and dog people

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Previous research has found that self-identified 'cat people' and 'dog people' differ on a number of personality traits. For instance, Gosling, Sandy and Potter (2010) found that dog people were higher than cat people on Extraversion, Agreeableness, and Conscientiousness, and that cat people were higher than dog people on Openness to Experience and Neuroticism. We sought to replicate these personality differences in a sample of Australian undergraduates (N = 257), and extended this focus to include political orientation, with the prediction that cat people would be more politically liberal than dog people. We will also discuss our ongoing research on the perceptions of cats and dogs and the reasons for pet preferences, and how these might relate to personality. This work follows on from Alba and Haslam's (2015) suggestion that people higher on dominance prefer dogs because obedient and submissive pets better compliment their personality compared to cats, who are lower on these characteristics.

Exploring individual differences in teacher-student boundaries through ethical dilemmas in the secondary school context

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Teachers face frequent ethical dilemmas in their daily work (Shapira-Lishchinsky, 2011), and require adequate skills in ethical reasoning (Strike & Solitis, 2009). 227 early career secondary teachers in Australia with up to five years' teaching experience responded to five vignettes presented within a survey. Each vignette outlined a brief situational context in which ethical boundaries of a teacher may be compromised (e.g. providing a hug to a student, or interacting via social media with a student). The interaction domains depicted in the vignettes were: physical support, online connectivity, emotional support, instrumental support. Three themes emerged in the responses across all vignettes: proposed action, contextual considerations, and protective behaviour. Higher order themes and their relationships are explored with consideration given to individual differences and the broader ethical and policy context of teachers.

An individual differences approach to sex, gender and sexuality: More diversity than we realise?

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Kinsey et al., (1949) used a seven point scale, rather than three categories, to ask about sexual orientation. In 2015 a survey company in the UK (YouGov.co.uk) reported that when presented with a 7 point Heterosexual to Homosexual scale the majority (54%) of 18 to 24 year olds did not identify as 'completely heterosexual'. In this presentation I will describe the development of a questionnaire designed to measure diversity in biological sex, gender identity and fluidity, sexual identity and fluidity, sexual behaviour, sexual attraction and romantic attraction. Data will be presented showing that, for both males and females, a stereotypical heteronormative profile is not the majority profile. Additional data relating sexual diversity to the experience of prejudice will also be presented. The findings have implications for the understanding of sex, gender and sexual diversities for oneself and others and the impact this has on wellbeing.

Personality and sexual self-disclosure: The importance of understanding individual differences in sexual behaviours

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The study of sexual interactions has gained quite interest within the field of romantic relationships. However, studies focusing on sexual interactions (e.g., sexual self-disclosure) tend to set aside the importance of individual variations. Taking into account that relationships are an interactive context, understanding the characteristics of each of the members in a couple is necessary in order to understand the relationship as a whole, especially when studying sexual behaviours. Two studies were carried out with the purpose of understading the link between personality and sexual self-disclosure. Study 1 compromised 108 Australian undergraduate students (79 women; 73%) who answered the 120-item IPIP for personality and three different scales of sexual self-disclosure (Snell, Belk & Papini, 1989; Harlow, Quina & Morokoff, 1991; Byers & Demmons, 1999). Study 2 compromised a sample of 91 Mexican (85 women; 93%) who answered the 50-item IPIP *(Spanish version)* for personality and the same 3 scales of sexual self-disclosure used in Study 1 (translated to Spanish through back-translation method). In general, results show that Agreeableness and Neuroticism does not show a significant link with sexual self-disclosure, while Extraversion, Openness to Experience and Conscientiousness did correlate positively with sexual self-disclosure. This study highlights the importance of understanding the individual in romantic relationships, especially when analysing sexual behaviours which can be affecting other areas such as mental and sexual health, and relationship satisfaction.

Disinhibition and train driver performance

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Despite the increasing adoption of modern technology in the rail industry, such automatic warning systems (AWS), train driving still remains a relatively complex form of human performance. In this paper we examine the key contextual and psychological factors that influence train driving performance and driving-related incidents. We argue that goal-conflicts such as on time running and safe train management can contribute to poor driving performance and increased risk of incidents for disinhibited drivers. By drawing on a well-established model of disinhibition, namely, the response modulation model of Patterson and Newman (1993), we explain how impulsive behavior and negative emotions can arise in individuals with high threat sensitivity and low working memory when facing approach avoidance conflict (a form of goal-conflict). Disinhibited train drivers, we propose, have difficulty switching attention between competing tasks, which contributes to poor driving performance and increased risk of incidents. We also describe the results of a quantitative study involving 56 experienced train drivers that provides evidence in support of this proposition. Finally, we recommend that the selection of train drivers could potentially be improved by utilizing the method and measures used in this study.

Cognitive influence on young drivers: Driving, cognition and personality

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There is strong and consistent evidence highlighting the relationship between cognitive function and driving safety for older drivers. Despite similar profiles in cognitive function for older people (declining) and younger people (developing), and the similarly higher crash risks for these two cohorts, cognitive function and its role in driving performance has been under-examined for younger drivers. Recent research comparing the cognitive function and driving performance for both older and younger drivers found that the relationship was the same for both groups, warranting further research. Traditionally, research into young drivers has focused on personality characteristics, such as anxiety, anger and sensation-seeking and their role in influencing driving both directly, and indirectly through attitudes towards safety in driving. The present study aims to apply a model of cognition and driving in older drivers to a young sample, and investigate how this cooperates with an existing model of young people's personality, attitudes and driving behaviour.

Participants were 152 undergraduate students, 57.3% female with an average age of 19 years. In line with previous models, participants were examined on road knowledge, driving behaviours, and driving attitudes, as well as anxiety, anger and sensation seeking. They also completed a battery of cognitive tests and two drives on a driving simulator. Results will be examined in light of both the model for cognition in older drivers and the existing model for young people's driving behaviours, attitudes and personality.

A chronobiological perspective on the relationship between Morningness and Conscientiousness

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Investigations of relationships between chronotype and personality show that 'morning-types' consistently report higher levels of Conscientiousness than 'evening-types'. Such findings have been used to draw conclusions about how Conscientiousness relates to circadian variables, in particular circadian phase. Two potentially erroneous assumptions underlie these conclusions. First, from a chronobiological perspective, chronotype does not adequately explain circadian phase – the sleep/circadian phase relationship is also an important chronobiological feature to consider in these cases. Second, from a methodological perspective, sole reliance on self-report measures may artificially inflate the magnitude of relationships due to the potential for shared method variance. Investigations of personality/circadian phase relationships should therefore incorporate at least one independent, objective measure of circadian phase and consider how sleep interacts with circadian phase. In this presentation I explain how objective circadian data collected under a tightly-controlled laboratory protocol relates to both chronotype and personality, what the implications are for our understanding of the relationship between these variables, and the broader importance of these findings for individual and societal well-being.

Investigating the associations between Stress, Mindfulness and Personality

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The physical and psychological experience of stress differs substantially between individuals. Research has demonstrated that regular mindfulness practice can reduce the amount of stress experienced by individuals, however the benefits of 'one-off' mindfulness exercises has received less attention. The effectiveness of Mindfulness intervention on the Big Five personality traits also requires further investigation. The current study aimed to determine the effect of a short one-off mindfulness exercise on both psychological and physiological stress responses within a performance context, and whether personality traits would impact these differences. A random control design was used. Participants completed a pre-post-questionnaire package, including the NEO PI-R, wore a heart rate monitory, supplied a number of cortisol samples, and took part in the Trier Social Stress Test. The experimental group also participated in a short mindfulness activity. Preliminary results indicate that the Trier Social Stress test increased the amount of perceived stress in participants. However, the control group experienced a smaller increase in perceived stress scores (11.32%) compared to the experimental group (39.38%). Participants who scored high on the Neurotic trait and were in the mindfulness group experienced an 8.64% increase in perceived stress compared to their control counterparts who only experienced a 5.88% increase, these findings require further investigation. These results imply that the use of a 'one-off' mindfulness exercise to reduce stress responses may actually be counter-productive. The mindfulness group experienced a higher increase in psychological stress and physiological stress.

Social-relational personality concepts across cultures

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Indigenous personality research in various countries such as China and South Africa has identified salient social-relational personality concepts. These concepts deal with predispositions in the domains of interpersonal and social behaviour, and are not well covered by the Big Five model. How relevant are these social-relational concepts beyond the cultures where they were initially identified? The present study investigates the relevance of a model developed in South Africa in the different, but similarly multicultural context of New Zealand. The construct and predictive validity of the South African model were assessed with reference to the Big Five model. Over 600 university students of various ethnic backgrounds in New Zealand completed the South African Personality Inventory

(SAPI), the Big Five Inventory (BFI), and measures of family and interpersonal relationships and well-being. The SAPI model was clearly identifiable in the data. The results are discussed with respect to the integration of universal and culturally specific aspects of personality. Implications are drawn for the importance of social-relational personality concepts across cultures, with a special emphasis on multicultural contexts such as New Zealand and Australia.

Big Five personality changes in 103 years of State of the Union addresses

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Western politics has shifted in recent decades, from a focus on policy, to one of individualised politicians and the 'language of personality'. We argue there should be corresponding changes over time in Big-Five personality traits portrayed by political leaders. We examined Big-Five trait content in United States Presidents' State of the Union (SOTU) speeches over the last 103 years. Ninety-two SOTUs, from 1913 to 2016, were analysed using the IBM Personality Insights service, which tokenised the speech transcripts, and matched these tokens to the Linguistic Inquiry and Word Count (LIWC) psycholinguistics dictionary categories. Computed scores for each category were then weighted using correlation coefficients between the LIWC categories and Big-Five traits. Results indicated a significant linear decline in Openness/Intellect speech content over time, as well as a significant increase in both Extraversion and Agreeableness content over time. The increasing role of the media in political communication has been identified as a driver of candidate-centered politics, and the accompanying expectations of political leaders are reflected in the personality traits they portray.

The impact of personality on discussion content in problem solving groups

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We study how group members' personality is related to verbal discussion content in problem solving groups. In a laboratory study, 100 participants worked in groups to solve an intellective task. After the sessions, group discussions were content-analyzed for verbal discussion content. Results derived with multivariate general linear model show that group members' openness and agreeableness are systematically related to verbal discussion content categories during problem solving group discussions. Implications for group composition and problem solving effectiveness are provided.

Influences of the Five Factor Model of personality in biblical writings

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Numerous recent studies have examined the relationship between aspects of religious belief and the dimensions of personality but, as far as I am aware, no previous study has attempted to show that biblical writers (such as the most prolific New Testament writer, the apostle Paul) were influenced by the Big Five/Five Factor Model, or any comparable model, of personality. I argue, based on biblical material and the writings of established biblical scholars, that the structure of the central ideas contained in Paul's doctrine of salvation (as outlined in that writer's "Epistle to the Romans") closely reflects the five factors of the well-known Five Factor Model (FFM). My starting point is the theory of Duke University theologian Douglas Campbell, who understands Paul's theory of salvation to include the central concepts of "life", "death and sin", "enslavement verses freedom", "love", and "the Spirit". I argue that these concepts can be connected, respectively, to the FFM dimensions of Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness/Creativity. While, in light of time constraints, I concentrate on providing evidence to support a connection between Paul's ideas and the FFM, several possible interpretations of the proposed relationship are briefly discussed.

The effect of acute fear on job performance: Towards a more dynamic model

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Despite the prevalence of fear in the workplace and evidence that it has a notable impact on job performance, research on the topic has been scarce. Theoretically, the current views of the acute (or short-term) relationship between fear and job performance are often in conflict, with most scholars arguing for a linear, negative relationship whilst others postulating potential positive effects of fear. To develop a more refined understanding of how fear impacts job performance, we include recent advances from the psychological literature. Through a series of propositions, we build a model where the link between fear and job performance is mediated by physiological and behavioral changes induced by heightened arousal, the Fight-Flight-Freeze response, and submissive behavior. Also, we posit that the links are likely moderated by the processes of top-down control of goal pursuits. Our analysis suggests that low levels of acute fear in the workplace can be productive in some contexts. Future research directions and the ethics of manipulating fear in the workplace are discussed.

Priming cognitive style in the prediction of managerial innovation

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Innovation is essential for firms to thrive in the current competitive business environment. What is not clear is the influence of cognitive style on innovative ideas. In the current study, we utilised an online sample of 218 managers of at least four employees and randomly allocated them to either a local processing or global processing condition. Using a Navon style task of large letters comprised of small letters, local processing participants were instructed to attend to the small letters and global processing participants were instructed to attend to the large letters. Participants completed three creativity and innovation tasks with the Navon priming before each task: the Tower of Hanoi task as an index of innovation, the Brick unusual uses task as an index of divergent thinking creativity, and a managerial specific task of divergent thinking creativity. Results are currently being analysed and will be ready to present at the conference.

Do personality and emotional intelligence have a role in predicting leadership styles?

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Individuals' leadership style has been identified as highly influential on followers' responses and for overall success in attaining organisational and individual goals. Two leadership styles: transformational, where the leader appeals to followers' moral values and helps them transcend their own personal interests for the greater good of the team or organisation and transactional, where the leader motivates followers through appeals to their self-interest using a system of contingent rewards. While past research has addressed the role of personality in predicting leadership style and related personality to emotional intelligence (EI), the relationship between all three and job type lacks empirical evidence. The aim in this study was to investigate these relationships in a convenience sample of 110 participants (32% males, M age = 29.47 years). Volunteers completed the Transformational Leadership Inventory, the Emotional Intelligence Questionnaire and the Ten Item Personality Inventory. There were no gender or job type differences (7 types, e.g., sales, education, arts) on leadership style. Transformational and transactional styles correlated .32 suggesting some overlap between the constructs. Only EI predicted transactional leadership while transformational style was predicted by EI, extraversion, neuroticism and

conscientiousness. In terms of transformational leadership, there is some suggestion in the data that EI might actually moderate the other personality constructs, in this case extraversion and conscientiousness. Such a finding is congruent with EI being demonstrated by empathy and those with a transformational style being considerate of the values of others. The implications of the results and future research will be discussed.

Closer & closer: Better comparisons of personality and performance

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Research on personality and its association with work performance has typically relied upon self-other correlational designs, in which personality is self-rated and performance is rated by someone else, typically a supervisor. These designs have been preferred over self-self designs because they minimise method effects. Unfortunately, self-other designs introduce distinct-source biases, which can be substantially greater than method effects. To overcome this, a multirater-multitrait study was undertaken within the oil extraction industry, using both self- and supervisor ratings. Latent variable methods demonstrated that adequately modelling both raters and traits resulted in significantly stronger correlations between personality and performance measures. These results have implications for not only the role of personality within the workplace, but also for the understanding of personality itself.

Exploring the relationship between thinking styles, and anxiety and depression

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In the study of anxiety and depression most research has focused on personality as risk factors for psychopathology (Klein, Kotov & Bufferd, 2011). While the traits of neuroticism, extraversion and conscientiousness have been linked to anxiety and depression. Another area of differential psychology that may offer an alternative perspective on psychopathology is that of style research, more particularly thinking styles. The literature on thinking styles is peppered with a multitude of models of thinking styles, therefore being hindered by a lack of consensus over a comprehensive taxonomy of thinking styles. The Ways of Thinking (WOT) model of thinking styles was developed by J. Roodenburg (2006) with the aim of providing this much needed consensus taxonomy. The current study aimed to use the WOT instrument (Roodenburg, 2015; Costello, 2016) in order to explore the relationship between thinking styles and anxiety and depression. Results from regression analyses showed significant associations between WOT factors and anxiety ($F (11, 816) = 24.799$, $p < .001$, $r^2 = .251$) and depression ($F (11, 816) = 38.096$, $p < .001$, $r^2 = .339$). Implications and suggestions for future research are discussed.

Can situational judgement tests measure non-cognitive attributes?

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There is increasing interest among medical schools and post-graduate institutes in using situation judgement tests (SJTs), primarily to assess knowledge and judgement in applying procedural skills. In some cases in both Australia and UK, there has also been a move to use them to measure attributes such as professionalism and interpersonal skills, and also personality and motivation based constructs thought to underlie the potential to develop such skills. However, clear evidence of validity is difficult to find for non-cognitive applications, and there are technical issues such as appropriate scoring. This paper reviews some of the research on SJTs with a view to generating discussion about their applicability in personality and motivational applications.

The influence of personality and culture on response styles

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Questionnaires using likert-scales are popular methods of gathering data in research. When using likert-scales, it is assumed that data collected is a true reflection of what the researcher wishes to measure. Despite this assumption, research has found that an indivudual's response style can act as a potential confound, contaminating and influencing the conclusions drawn from the data. This study sought to investigate how an individual's personality, as defined by the Five-Factor Model, and cultural background using Hofstede's cultural dimensions can impact on the likelihood of an individual demonstrating three commonly recognised response styles: acquiescence, social desirability response bias and extreme response style. Using previously collected data from over 300 000 participants via the My Personality Facebook App, personality scores as calculated by a 100 item IPIP version of the NEO-PI-R and cultural dimension scores developed by Hofstede were examined in multiple regression analyses in order to investigate how well personality and culture can predict response styles. Multiple regression analyses revealed that peresonality explained a larger proportion of variance in the three response styles than culture. While both personality and culture were significant predictors of the response styles, the effect sizes for culture were found to be very small. The results of the current study suggest that culture plays little role in response bias.

A presentation of evidence showing individual differences in the dimensionality of personality structures

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Demonstrating the universality of personality traits has long been part of what personality trait researchers do. In general terms, this has meant showing that all people have the same personality traits. However, this approach to the universality of personality traits is based on a poor understanding of what universals are. Universals are not meant to identify anything that is found everywhere, but instead denote features of reality that can be found anywhere. The implication for trait theory, is that individuals could have a greater or lesser number of personality traits than other individuals. Moreover, the methodologies currently used to assess the structure of personality rely on aggregated data from multiple individuals. As a result, we cannot evaluate the complexity of individual personality structures. However, new methodologies offer a way forward. In this study, one such methodology was used to evaluate the dimensionality of individual responses (N= 195) to a measure of the Big Five. This evaluation supports the idea, that the dimensionality of individual personality systems varies. Individual responses to personality questionnaires were shown to generally fit a 3 to 10-dimensional solution, while for most individuals, a 5 or 7-dimensional solution was ideal. This research suggests that individual differences in personality are not just about the extent to which people do or do not express some set of traits. Instead, it suggests that complexity is also a feature of the way that overall personality structures can vary.

45Latent profile analysis of a child Five Factor Model personality scale and subsequent relationships of identified groups with a commonly used psychosocial broadband scale

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It has been recognised that the variable-centred approach of personality trait research, while embedded in a strong literature base, lacks the ability to explore the intra-individual variation in personality, a keystone of individual differences research. To address this, person-centred grouping of people has consistently found three type of persons: the Resilient, Overcontroller, and Undercontroller, often identified through their relationship with psychosocial scales. Continuing research with adult and child trait scales is identifying other groups of people. Latent profile analysis (LPA) is one method that is emerging as an alternative approach to such identification. In this study, LPA is used to analyse data collected from carers completing the Australian adapted Hierarchical Inventory of Personality in Children. Children were grouped according to their five factor model profiles

and group memberships were confirmed using canonical discriminant analysis. Meaning was attached to each group or class through the relationship with the Strengths and Difficulties Questionnaire domains. Five classes of children were identified with differing relationships with the SDQ domains. Direct clinical and research implications will be identified including the finding that different personality trait profiles may predict psychosocial functioning of children.

Task-based assessment of risky decision-making: A risky proposition

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The Balloon Analogue Risk Task (BART), Iowa Gambling Task (IGT), Game of Dice Task (GDT), and similar measures are used to assess risk-taking or risky decision-making. The validity of these tasks is supported by correlations with real-world risk-taking and by neurological findings. However, different risky decision-making task outcomes do not always correlate with each other, or with theoretically consistent personality traits such as impulsivity. This study uses data from 120 undergraduate participants who completed the BART, IGT, and GDT to explore the implications that disparate task designs, engagement issues, and state versus trait conflicts hold for task-based measurement of risky decision-making, with the aim of informing future design and use of risky decision-making tasks.

Sensation seeking and sleep deprivation in young adults

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Numerous studies have demonstrated a link between sleep deprivation and risky behaviour. The role played by personality traits, however, has not been investigated in those studies. One personality trait associated with risky behaviour is sensation seeking, which refers to the tendency to seek novel, complex and stimulating experiences. In the present research we aimed to investigate whether sensation seeking influences the link between sleep deprivation and risky behaviour. We focused on young people who are sleep-deprived as a result of a lifestyle choice, in contrast with those who suffer from insomnia-related sleep loss. A total of 536 young adults participated in this study. Three groups were selected: normal sleepers, insomniacs and voluntarily sleep-deprived participants (who choose to spend some of the time normally devoted to sleep on other activities). Results show that compared to normal sleepers and insomniacs, young adults who have the habit of deliberately depriving themselves from sleep score higher on the Sensation Seeking Scale.

They also drink more alcohol and take more risks in dangerous driving situations. On the other hand, insomniacs, who are also sleep-deprived but score low on the Sensation Seeking Scale, do not take more risks than normal sleepers. These findings suggest that personality, more specifically sensation seeking, plays a crucial role in the link between sleep deprivation and risky behaviour. Our results have also implications for risk prevention, particularly regarding the high-risk group of young people who deliberately adopt a lifestyle of sleep deprivation.

Can the new very short form of infant temperament measure (IBQ-R-VSF) be used to predict which kids will be the terrible twos?

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The 'terrible twos' are often associated with increased temper tantrum, noncompliance and aggression. While some expression of these behaviours is normal at this age, there is increasing interest in understanding whether early individual factors can predict which children are most at risk of more frequent or prolonged emotional and behavioural problems. The current study used a sample of 6067 toddlers to investigate whether a new brief measure of temperament measured at the age of 9 months (Infant Behaviour Questionnaire-Revised.Very Short Form) was associated with the development of both difficult behaviours and pro-social behaviours at aged 2 measured using the popular Strengths and Difficulties Questionnaire (SDQ). Controlling for a range of demographic and maternal characteristics, the results indicate that temperament aged 9 months explained an additional 1 – 6 % of the variance in toddler behaviour. High Negative Affect (NEG), high Positive Affect and Surgency (PAS), and low Orienting and Regulatory Control (ORC), low Fear and Low Affiliation related to increased toddler Hyperactivity and Inattention Symptoms. High NEG, high Fear and low PAS were associated with higher Emotional Symptoms. High NEG, high PAS, and low ORC and low Affiliation was associated with increased Conduct Problems. High NEG and high Fear and low Affiliation was associated with higher Peer Problems. Finally taking a strengths perspective high ORC, high PAS, high Affiliation and low NEG were associated with increased prosocial behavior (using both the original SDQ Prosocial scale and a modified version of the scale). These findings from this large and demographically diverse cohort provide the first longitudinal validation of the new IBQ-R VSF and suggest that infant temperament is associated with the behavior strengths and difficulties of children who are two years old.

How does prenatal alcohol intake relate to perceptions of infant temperament and child behaviour? Evidence from Growing Up in New Zealand

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A recent study estimated that at least 1 in every 100 live births in New Zealand (NZ) is affected by Fetal Alcohol Spectrum Disorder (FASD) and that NZ could be losing as much as $200 million in labour force productivity per year due the disease. While severe FASD cases are often diagnosed at birth, frequently the diagnosis occurs much later when the child starts to have problems with learning and behaviour, or sometimes the condition may never be diagnosed. In a sample of 6471 mothers in the Growing Up in NZ longitudinal study we investigated whether alcohol exposure antenatally was related to infant temperament at 9 months on the Infant Behavior Questionaire Revised Very Short form and child behaviour problems aged 2 on the Strengths and Difficulties Questionnaire (SDQ). Associations were found not only for high alcohol consumption (drinking 20 plus units a week), but also any alcohol consumption, and particularly alcohol consumption in the first three months when many women do not know they are pregnant. In particular, alcohol consumption was associated with lower levels of infant affiliation and higher levels of conduct problems and total difficulties. While we do not know how many of these infants will go on to get a diagnosis of FASD, these findings suggest that antenatal alcohol consumption may be associated with some very early behavioural tendencies that may warrant closer monitoring by health professionals.

Defining and exploring moral vitalism

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In this talk I will discuss recent work on a new construct "moral vitalism" which refers to how people think about the nature of good and evil. High scorers on a measure of moral vitalism view good and evil as real (they exist independent of human minds) and agentic (they can influence people and events). I will present our work on this construct demonstrating that holding a belief in moral vitalism has important implications for understanding moral cognition and ideological conflict. First, I will review research showing the moral vitalist's worry about being contaminated by evil through spiritual possession and

contagion (indirect contact with immoral others). Relatedly, that they are also worried about maintaining mental purity. Second, I will review research showing that moral vitalists are both intolerant of, and threatened by, ideological diversity. Finally, I will present data pointing to the origins of moral vitalism, which suggest that this belief may have emerged as a way of explaining the effects of physical illness.

Individual differences in socio-moral creativity: Exploring the structure and correlates of a novel measure

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Many complex social issues are characterized by moral problems, whereby a given course of action might mitigate one moral concern whilst compromising another. Such problems have malleable parameters that invite an indefinite number of responsive actions, many of which may successfully resolve the moral tensions at stake. This research therefore extended previous work by postulating *socio-moral creativity* (SMC) -- the capacity to generate multiple, diverse, unconventional, acceptable solutions to moral problems -- as a plausible trait dimension capturing inter-person variation in moral problem-solving proficiency. Given the dearth of empirical research in this domain, this study aimed to (1) develop a measure of SMC, (2) explore its structure, and (3) evaluate its convergent and concurrent validity against conceptually relevant traits. Using a sample of university students and community members (N = 119; 57% women), SMC was assessed by coding the Fluency, Flexibility, Originality, Relevance, Empathy, Acceptability, and Content of participants' divergent (i.e., open-ended) responses to three researcher-designed moral problems. A Principal Components Analysis recovered two dimensions, labelled SMC-Generativity (i.e., expansiveness of solution generation) and SMC-Exceptionality (i.e., quality of generated solutions), which were intriguingly uncorrelated (r = -.04). Though SMC-Generativity was associated with several validation measures (viz., Intellect, Compassion, Politeness, Divergent-Thinking), SMC-Exceptionality failed to converge or concur with relevant traits (e.g., Agreeableness, Honesty-Humility, Moral-Imagination, pro-social preferences). Counter to expectations, this may imply that (a) this study's novel measure targeted traditional Divergent-Thinking rather than SMC; or (b) the creative and moral aspects of SMC do not cohere as a uniform trait.

National and supranational identities as predictors of well-being

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What intra-individual factors lead to well-being and what role do collective identities play in this process? The effects of basic personality traits are well-established, but holding a secure identity and being able to receive support from in-group members can also enhance psychological well-being. Collective identities can be ordered from more concrete (e.g., national) to more abstract (e.g., European), and can be affected by both individual (e.g., Openness) and contextual (e.g., ethnic diversity) factors. The present study investigated the interplay of Openness and perceived diversity as antecedents, and national and European identities as mediators in the prediction of well-being. The study was conducted in two Eastern European countries, Bulgaria and Romania, which are interesting because of their recent membership of the European Union. An online self-rating questionnaire was administered to 204 Bulgarian and 163 Romanian university students. The composite measure of well-being included satisfaction with life, positive and negative affect, purpose, and meaning of life. Openness and perceived diversity both predicted well-being. The effect of Openness was partially mediated, and the effect of diversity was completely mediated by both collective identities. The results suggest that the beneficial role of collective identities is not exclusively based on the ability to receive social support, because it is also found in abstract identities, such as the European identity. Collective identities should receive more attention in psychological praxis.

Sense of university belonging as a mediator of the relationship between Extraversion and psychological well-being

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Over the past decade the well-being of university students has been steadily declining. In order to develop and implement effective programs to address this decline, it is necessary to determine factors that influence students well-being. Personality research has consistently found a strong link between extraversion and well-being. However, despite the clear association between extraversion and well-being, the mechanisms underlying this

relationship still have to be explored. Sense of belonging offers a potential explanation for this relationship, as it has been associated with both extraversion and well-being. The study presented here aimed to determine whether sense of university belonging mediates the relationship between extraversion and psychological well-being. Participants were university students and completed an online questionnaire that included an adaptation of the Psychological Sense of School Membership Scale (PSSM) to determine their psychological belonging and university membership, the International Personality Item Pool Representation of the NEO PI-R (IPIP NEO-120) to determine their level of extraversion, and the Psychological Well-being Scale (PWB). Results of this study and their implications will be presented and discussed.

A deeper connection: The Big 5 and Honesty as predictors of Instagram investment

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Existing research has measured the intensity and emotional connection to use of social media platforms such as Facebook. However, the emotional experiences, and the extent to which people are engaged with the image-based social media platform Instagram, have yet to be explored. This study aimed to address this gap in the literature by measuring the emotional investment users experience regarding their posts on Instagram, and investigating the personality traits that predict such investment. It was hypothesised that greater investment in ones Instagram posts would be positively predicted by neuroticism, due to the anxiety captured by greater investment; and negatively predicted by honesty/humility, as more honest and humble users should be less concerned about their appearance and the response they receive from others. Participants (*N* = 129) completed an anonymous online survey, where they responded to questions regarding Instagram investment and measures of the Big 5 and honesty/humility. A hierarchical multiple regression with the Big 5 in Step 1, and honesty/humility in Step 2, produced two significant models, accounting for 15% and 24.9% of the variance in Instagram investment respectively, and confirming our hypotheses with significant individual contributions from both neuroticism and honesty/humility. The findings help to explain the type of social media user who would experience greater investment in their Instagram posts. Further, the link found between neuroticism and emotional investment suggests that there may be negative implications (e.g. increased anxiety) among frequent Instagram users who experience a deeper investment in the images they post.

Dark personalities: Exploring the links between cognitive style and the Dark Triad

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The Dark Triad, a socially repugnant trilogy of overlapping personality dimensions: Machiavellianism, Narcissism and Psychopathy, has been adopted as a framework of individual differences in aversive personality (Paulhus & Williams, 2002). While personality is comprehensive in accounting for normative individual differences, researchers have questioned whether an alternative construct, namely cognitive style, has the potential to offer a unique perspective in the exploration of individual differences (J. Roodenburg 2003, 2006). With a sample of 828 adult participants, this study set out to explore the relationship between cognitive style and the Dark Triad. The results found that cognitive style explained a significant amount of variance in Machiavellianism (14.2%), Narcissism (22.9%) and Psychopathy (15.9%). Given that the way in which one thinks is related to an individual's propensity towards a dark personality, cognitive style may play a useful role in furthering our understanding of individual differences in aversive personality within non-clinical populations.

Grandiose and vulnerable narcissism as moderators of responses to social status feedback

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Individuals have a need to see themselves in a positive light. One aspect of self-perceptions that contributes to how we see ourselves is our relative standing in the groups that we belong to. High social standing is related to experiencing positive emotions whereas lower social standing is related to experiencing negative emotions, although not all individuals respond in the same way to feedback about their relative social standing. In the present study we examined the moderating impact of grandiose and vulnerable narcissism on responses to social status feedback on a hypothetical task. Not surprisingly, those receiving information that they had higher social status were happier and less angry and disappointed than those receiving information that they had lower social status. Reported anger was moderated by both grandiose and vulnerable narcissism. Those higher in both grandiose and vulnerable narcissism were angrier when given average social status feedback. Further, grandiose narcissism was positively associated with the reported accuracy of the hypothetical task when high social status feedback was given and negatively associated when average social status feedback was given. The implications for the impact of the two forms of narcissism on social relationships are discussed.

Gender, the Dark Tetrad, and self-esteem as predictors of Internet trolling behaviour

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With 46.4% of the population accessing the internet on a daily basis, the Internet has quickly become an essential part of everyday life across the globe. However, this increased use has also led to the development of antisocial behaviours emerging online. In particular, Trolling is one such online antisocial behaviour that has received very limited attention thus far. Previous research has established that gender and dark personality traits predict engagement in Trolling behaviours. However, the utility of other personal traits, such as self-esteem, have not yet been explored. Therefore, the current study sought to investigate the utility of gender, the Dark Tetrad (psychopathy, Machiavellianism, narcissism, and sadism), and self-esteem in predicting engagement in Trolling behaviours. Participants (N = 628, 78% women and 22% men) had a mean age of 25 years (*SD* = 8.97), and completed an online questionnaire which comprised of personality measures, a self-esteem scale, and a revised Global Assessment of Internet Trolling Scale. Results showed that, consistent with previous research, gender, psychopathy and sadism significantly predict Internet Trolling behaviour; with sadism as the strongest predictor. Results showed that self-esteem had no significant predictive utility for Internet trolling behaviour. However, this lack of predictive utility of self-esteem significantly adds to the body of literature on Trolling. As previous research has shown self-esteem predicts engagement in cyberbullying behaviours, this further distinguishes Trolling from other online antisocial behaviours. These findings indicate the need for further study into Trolling behaviours, as equivalence with other online antisocial behaviours cannot be assumed.

The Dark Tetrad and mating orientations: Revisiting dark traits and mating strategies

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Research has extensively considered factors that influence short- and long-term mating orientations, such as gender and individual personality. Although research has established the role "darker" personality traits (the Dark Triad) play in mating orientation, as the triad has recently been conceptualised as a tetrad, further exploration into this relationship is warranted. Furthermore, as previous literature has predominantly characterised human mating strategies in a dichotomous format (either short-term or long-term), this does not allow the exploration of mating strategies on a continuous scale. The aim of the current study was twofold: First, to assess mating orientations on a continuous scale; and to establish the utility of gender and the Dark Tetrad traits in predicting these orientations. Participants (N = 461, 37% men, 63% women) with a mean age of 24.73 years (*SD* = 7.86) completed an online questionnaire assessing personality traits and mating orientations. Results showed that men exhibited stronger short-term mating orientations than women. Furthermore, trait narcissism, psychopathy, and sadism positively predicted short-term mating orientations for both men and women. For long-term mating orientations, contrary to previous research there was no predictive utility of gender. However, higher levels of trait narcissism and lower levels of psychopathy and sadism predicted a stronger long-term mating orientation. These results establish the utility of the Tetrad in predicting short- and long-term mating orientations, and offer future mating orientation studies an alternative continuous measure to the traditional dichotomous format.

Personality prediction of medical student grades: Comparing broad and narrow traits across applicant and non-applicant contexts

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While previous research has shown that personality tests can predict grade point average of medical students, little is known about (a) whether personality tests remain predictive when a personality test is administered in a selection context where respondents may be motivated to fake, and (b) whether narrow personality facets provide incremental prediction over and above factor-level models such as the Big 5. The current study

compared the predictive validity of broad and narrow traits in an applicant and a non-applicant sample. Both samples provided GPA averaged over the entire medical degree and standardardised across universities, and NEO-PI measures of Big 5 and 30 facets of personality. The applicant sample consisted of 530 medical graduates who completed the personality test as part of a job application for one of several positions as doctors at an Australian hospital. The non-applicant sample consisted of 564 Flemish medical students who completed the personality test in the first year of their medical degree purely for research purposes. Results showed that relative to population norms and the non-applicant sample, applicants had much higher scores on conscientiousness, openness, agreeableness, extraversion and emotional stability (average d=1.06). Prediction of GPA was substantially greater when predictors were facets, as opposed to factors. In particular, the facet of achievement striving was positively related to GPA. Overall, results suggest that facet-level measurement provides substantial incremental value in selection settings, and that the pattern of personality predictors in selection settings can be quite different to that seen in non-selection settings.

The incremental validity of curiosity and confidence for predicting academic achievement in advanced tertiary students

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Intellectual curiosity is a current topic of research interest and often predicts academic achievement. However, evidence for its incremental validity, which the present study aimed to assess, is mixed. Participants were 209 (53 males) third-year psychology students (age *M* = 23.1 yrs) who completed tests of fluid and crystallised intelligence, confidence, five-factor model personality, and intellectual curiosity. Academic achievement was obtained from university transcripts. No incremental validity above intelligence and FFM personality was found for any measure of curiosity or confidence. Consistent with prior research, Conscientiousness predicted significant variance in academic achievement. Future research may focus on the conditions in which intellectual curiosity or confidence predict academic achievement.

Put on a happy face: How does emoticon use influence perceptions of an educator's personality?

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Assessment of the effectiveness of teaching in higher education continues to be based on student evaluations which can be driven by social perception of the lecturer, rather than on the achievement of concrete learning outcomes. However, little is known about the ways in which the use of online media can influence the impression formation of students in regards to the personality characteristics of their educators. This study builds on existing research highlighting the importance of perceived social presence in determining students'reactions to online learning. The aim of this study was to investigate whether the inclusion of emoticons (e.g. :)) in online-presented written feedback influences university students' perceptions of a marker's personality. Participants (*N*=210 first year students) were randomly assigned between two groups, both viewing identical online feedback on a faux essay, with one group viewing feedback which also included five emoticons embedded within the marker's comments. To ensure engagement with the task, participants were asked to rate the feedback in terms of its utility. Participants were then asked to report the extent to which they agreed with a series of statements about the marker's personality characteristics, drawn from the HEXACO model. Analysis via *t*-test indicated that using emoticons in feedback resulted in the marker appearing significantly more extraverted, agreeable, and open to experience. These results suggest that in an online educational environment, only small cues are needed to influence the generation of implicit personality theories, and that inclusion of emoticons may be associated with more favourable student perceptions of educators.

Longitudinal trajectories of depression symptoms following traumatic brain injury

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The study used Growth Mixture Modeling (GMM) to investigate the classes and longitudinal trajectories of depression symptoms following traumatic brain injury (TBI). It also examined how these classes were predicated by a number of covariates. Participants were 744 adults with mild TBI, and they were assessed for depression immediately after injury, and at 1, 3, 4, 12 and 24 months after injury. The results revealed three trajectory classes: low, high and delayed. Compared to the low class, the delayed and high classes were older and spent more days in hospital, and the high class also had more females. The low class had relatively more individuals with sport injury; the high class had relatively more individuals with assault. The clinical and rehabilitation implications of the findings are discussed.

The role of Autistic traits and employment status in subjective well-being in the general population

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Current research suggests individuals with Autism Spectrum Disorders (ASD) show poor employment outcomes. However, it is unknown whether individuals in the general population without a diagnosis of ASD, who demonstrate increased levels of autistic traits, also experience lower rates of employment. How autistic traits and employment status interact to affect an individual's well-being is also currently unknown. To investigate gaps in the research of autistic traits, employment and well-being a study of 368 participants from the general population was conducted. Participants' levels of autistic traits, subjective well-being (SWB), employment status as well as other demographic variables including age and gender were measured using a self-report online questionnaire. Findings indicated a significant relationship between autistic traits and employment status, with higher autistic traits linked to unemployment. Autistic traits were also shown to contribute to the prediction of SWB. Employment status was finally shown to moderate the relationship between autistic traits and SWB. This study identifies that autistic traits play a role in the ability to gain and sustain employment in the general population, suggesting the need for more tailored employment programs, which work with potential underlying social difficulties. Higher levels of autistic traits were also related to lower levels of SWB in the general population. However, employment was found to be a factor that weakens the impact of this relationship. Therefore, this study suggests that employment can be a protective factor in those with higher levels of autistic traits in the general population.

Obsessive-Compulsive Disorder: Is personality predictive?

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Obsessive-compulsive disorder (OCD) is an anxiety disorder typified by recurrent thoughts and/or repetitive behaviours with a prevalence rate around 2 per cent. While some personality characteristics have been associated with OC Personality Disorder less attention has been paid to these with respect to OCD itself. Further, personality variables involving control and self-doubt (recurrent themes in the OCD literature) have been related to other psychopathologies. It was the aim in this study to explore whether an external locus of control, Type A behaviour, and hostility were related to OCD. Fifty-five people diagnosed with OCD and 30 university students acting as controls participated in the study. All participants completed the Padua Inventory, IPC Scale, Trent Attributional Scale, the Hostility and Direction of Hostility Questionnaire, and a shortened form of the Jenkins

Activity Scale. The OCD group was confirmed as scoring higher on the Padua Inventory and each of its subscales: impaired mental control, becoming contaminated, checking behaviours, urges and worries of losing control of motor behaviour. Multiple regression analysis revealed that high levels of hostility were significantly predictive of OCD, as measured by the Padua, and each of its subscales. In addition, high scores on internal attributions were significantly negatively related to overall scores on the Padua, impaired mental control and becoming contaminated. Longitudinal research is necessary to determine whether hostility is a function of OCD or an integral component. Therapeutic considerations will be discussed.

Rapid electronic posters

Just world beliefs and forgiveness: The mediating role of implicit theories of relationships

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The belief in a just world (BJW) influences how people navigate their relationships. BJW effects differ depending on the extent to which one's BJW is concerned with the self (BJW-self) and others (BJW-other). In this study (N=160) we replicated previous research showing that BJW-self encourages forgiveness operationalized as benevolence and extended it to show, for the first time, that BJW-self predicts decisional forgiveness but, unexpectedly, not emotional forgiveness. Conversely, BJW-other encourages negative responding. Most importantly, the study makes a new contribution to BJW theorizing by integrating principles from implicit theories of relationships. Mediation models indicated that BJW-self obtains its association with forgiveness through growth beliefs, whereas BJW-other is associated with negative responding via the agency of destiny beliefs.

Nomological network of two-dimensional Machiavellianism

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Machiavellianism captures the tendency to hold a cynical view of humanity and the belief that others should be exploited whenever justified. Although Machiavellianism is two-dimensional, consisting of views and tactics, little is known about how these two-dimensions act separately. An international collaboration (k = 20, $N \approx$ 17,700) contributed data to further our understanding of two-dimensional Machiavellianism. Researchers contributed data from Korea, Hungary, Canada, North America, and Australia. Structural equation modelling supported the 10-item two-dimensional Mach-IV structure in all suitable samples. A meta-analysis suggested that males were consistently higher than females on both the views and tactics dimensions. Scores on both subscales also had a weak negative relationship with age. By re-analysing the data, we identified unique associations of Machiavellian views and tactics with four areas of functioning: development (retrospectively reported abuse and family functioning), personality (Big Five, HEXACO, narcissism, psychopathy), emotionality (emotional intelligence and regulation), and behaviour (in game scenarios). Both views and tactics dimensions related negatively to agreeableness, conscientiousness, honesty/humility, and positively with psychopathy traits. However, Machiavellian views, but not tactics, were positively associated with narcissism, not

reciprocating trust, and self-reported emotional intelligence deficits. These results stress the importance of investigating both Machiavellianism dimensions separately given their cross-cultural replicability and superiority to the one-factor solution, and their unique implications for research and practice.

Longitudinal stability of NEO-PI-R personality facets: Comparing bifactor, residualised, and observed score approaches

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Personality is commonly conceptualized hierarchically with broad factors each composed of several narrow traits. Although discussion of the need for narrow traits has a long history, there has been a recent resurgence in discussion of methodological issues related to assessing the value of narrow traits (e.g., Anglim & Grant, 2014, JRP; Ashton, Paunonen, & Lee, 2014, PAID). In contrast to merely examining observed facet scores, several approaches including bifactor modelling and facet residualisation have been proposed to more clearly identify the unique contribution of narrow facets. Bifactor models estimate facets and factors as orthogonal latent variables. Residualized approaches partial out variance of facets that overlaps with factors. Only limited research has compared the two approaches. In particular, there is a need to assess the robustness of facet estimates derived from the two approaches. Thus, the present study aims to assess the longitudinal stability of bifactor, residualized, and observed score approaches to estimating personality facets. The data comes from a sample of 933 alumni (53% male) from a Flemish university. Participants completed the full Dutch revised version of the NEO-PI-R when they finished their degree, and a subset completed it again 15 years later (n = 366) and 22 years later (n = 293). Measures of facets were obtained using observed score, residualized and bifactor approaches. Average test-retest correlations for facets were compared across approaches. Findings have implications for how narrow personality traits should be conceptualized and how such data should be analysed.

Accuracy of parent reports of children's cognitive abilities: A meta-analysis

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Parents are often considered as important sources of information regarding their child's social, emotional, and behavioural functioning in both clinical and research settings. However, the capacity of parents to report accurately on their child's cognitive functioning is less clear. By meta-analysing the existing literature on the relationship between parent reports of children's cognitive and academic abilities, and children's actual performance on standardised tests, this paper aims to determine the validity of parent reports. The analysis further seeks to identify child-, parent-, and item-level factors that moderate the strength of the relationship between the two variables, either increasing or decreasing the accuracy of parent reports. Overall, 20 studies reporting 70 effect sizes on the relationship between parent reports and children's actual abilities were analysed. The overall summary effect size was found to be r = .43, indicating that parents only have moderate insight into their child's cognitive capability. However, the validity of parent reports was found to be moderated by the type of response format used on the parent-report measure, and whether items on the measure referred to cognitive ability constructs or test tasks. Implications of these findings for future research directed at developing a reliable and valid parent-report measure of children's cognitive and academic abilities are discussed

Within psychology, the assessment of cognitive abilities provides a framework by which to understand the different ways in which children learn (Logsdon, 2014), as well as identify academic underachievement or specific learning disabilities (Baudson & Preckel, 2013). However, as the assessment of cognitive ability typically involves the administration of performance-based measures by a highly trained examiner (Jacobs, 2012), it can be a lengthy and expensive process. This implies that the capacity for obtaining a measure of cognitive abilities is ultimately reduced, meaning that some, possibly those who are most in need, miss out. One possible solution to this situation could be to utilise parents as informants of the cognitive abilities of children. Parent ratings have long been a method for understanding a variety of psychological and psychosocial constructs, such as personality (e.g., Hierarchical Personality Inventory for Children; Mervielde & De Fruyt, 2002) and emotional functioning (e.g., Child Behaviour Checklist; Achenbach & Rescorla, 2001), with research supporting the diagnostic utility of behavioural ratings provided by parents (McCandless & O'Laughlin, 2007).

Since parents have the unique opportunity to observe their child performing different tasks in various situations, it is reasonable to postulate that they are capable of providing realistic judgments of the child's ability (Sommer, Fink, & Neubauer, 2008). However, the capacity of parents to deliver reliable and valid estimates of their child's cognitive functioning is not clearly established in the existing literature. Accurate parental assessment of children's cognitive abilities is important as research has shown that these perceptions have the potential to critically influence various aspects of a child's

development (Gut, Reimann, & Alexander, 2013), such as academic self-concept (Frome & Eccles, 1998) and subsequent academic performance (Pomerantz & Dong, 2006). Given the implications of parents' estimates on children's future life outcomes, the issue of parent accuracy is critical.

The Accuracy of Parent Reports

In general, empirical studies investigating parent accuracy yield medium to high inter-correlations (above r = .50) between parent estimations and children's actual performance (Delgado-hachey & Miller, 1993; Hunt & Paraskevopoulos, 1980; Miller, 1986), indicating that parents are moderately accurate when judging their children's capabilities. However, parents are evidently far from perfect, and when they err, a marked tendency towards overestimations of their children's ability occurs (Deimann & Kastner-Koller, 2011; Miller, Manhal, & Mee, 1991).

While past research has identified a number of pertinent individual difference factors that influence the accuracy of parent estimations of children's abilities, the extant research differs greatly in the methodologies employed by studies. This could make a substantial contribution to the degree of accuracy observed, which means that parent inaccuracy may be grounded in a study's methodology rather than in parental diagnostic incompetence. Both individual difference and method factors that may influence parent accuracy are outlined below.

Factors Influencing Parent Accuracy

Child and parent factors.

Gender of child.

Previous research has found that despite the lack of clear evidence indicating that boys possess superior abilities in some domains (Burnett, 1996; Wigfield et al., 1997), parents tend to judge their children in a gender-stereotypical way. That is, sons are usually rated better in mathematics and visuo-spatial abilities (Furnham, 2000), as well as general cognitive ability compared to daughters (Furnham & Gasson, 1998; Furnham, Reeves, & Budhani, 2002). In contrast, girls have been consistently rated better than boys in literacy (Frome & Eccles, 1998), though this is in accordance with findings showing that girls tend to outperform boys in literacy skills as early as kindergarten (Denton & West, 2002; Pajares, Miller, & Johnson, 1999).

Gender of parent.

In addition to child gender potentially moderating the accuracy of parent estimates of children's cognitive abilities, research suggests that parent gender may also play a role. That is, while mothers have been found to be moderately accurate in predicting how well their child would perform on a series of IQ items, evidenced by a correlation of r = .53 between maternal prediction and child performance (Hunt & Paraskevopoulos, 1980), fathers appear more inclined to give higher estimates than mothers for their child's general,

analytical, and creative intelligences (Furnham & Petrides, 2004), indicating that fathers are less accurate than mothers in their estimations. This may be due to fathers having less feedback on their child's performance in academic areas, or having less contact with different children and so have fewer sources of comparison, thereby leading to higher chances of parental inaccuracy when estimating their own child (Chamorro-Premuzic, Arteche, Furnham, & Trickot, 2009).

Item factors.

The differences in methodologies employed by previous studies exploring the accuracy of parent ratings of children's abilities comprise of variation in the instruments used to obtain parent reports. This includes the number of items per construct, the type of comparisons respondents are asked to make, and how items on the scale have been phrased. These characteristics can be assumed to influence the strength between parent reports and children's performance, and are discussed further subsequently. To the best of the authors' knowledge, no study to date has directly investigated the potential influence of the following item factors on the validity of parent-reports of children's cognitive ability, which is a significant gap in the previous research.

Single- vs. multi-item measures.

Parent-report measures can be categorised according to whether authors have utilised single- or multi-item measures in their design. Single-item measures are known to be unreliable and likely to produce construct under-representation as they are narrower in scope (Epstein, 1983). In contrast, multi-item measures enable aggregation, thus reducing the error variance associated with the inability of single-item measures to adequately represent a broad construct, thus increasing the validity of the measure (Epstein, 1983; Jacobs, 2012). Previous studies comparing the validity of single- versus multi-item measures within the self-report domain have found support for the notion of aggregation (Ackerman & Wolman, 2007). Thus, since variability in study outcomes could arise due to this methodological factor, its potential influence on parent accuracy warrants investigation and will be explored in this study.

Intra- vs. inter-individual comparisons.

According to Festinger's (1954) theory of social comparison processes, estimates of cognitive abilities that are based on a frame of social reference (i.e., inter-individual comparison) are likely to produce more valid estimates than scales that do not (i.e., intra-individual comparison), which might only feature labels with absolute terms such as low or high ability (Freund & Kasten, 2012). Self-report scales that provide social comparison have been shown to possess higher validity than scales that do not (Mabe & West, 1982). Likewise with parent-report measures, it is proposed that estimations made on the basis of relative terms will be more valid than those made on the basis of absolute terms. Investigating the effect of this variable on parent accuracy can thus improve on existing methodologies of developing parent-report measures of cognitive abilities.

Construct vs. task

The way cognitive abilities are presented on existing parent-report measures differ in two ways: (a) only the cognitive ability term is described (e.g., visual processing - the ability to perceive, analyse, synthesise, and think with visual patterns, including the ability to store and recall visual representations) or; (b) a behaviour or task that is indicative of the cognitive ability area is described (e.g., seems very slow when using handwriting to copy material). Most studies (e.g., Furnham, 2000; Gut et al., 2013) have used construct definitions in their measures, with results indicating positive relationship between parent ratings and children's measured performance. However, Jacobs (2012) argues that presenting participants with items that refer only to a construct that lay people would be unlikely to have encountered often in their daily lives increases the likelihood of the items being perceived as ambiguous, thereby introducing greater error into the measurement process.

Waschbusch, Daleiden, and Drabman (2000) developed a scale with behaviourally-specific items proposed to be indicators of the ability constructs within the extended G*f*-G*c* differential theory of cognitive abilities (Cattell, 1943; Horn, 1991). Reported correlations between the developed scales and performance-based measures of the cognitive ability factors ranged from r = .29 to .45, indicating that parents were able to report on their child's cognitive functioning with some degree of specificity. By describing specific tasks that are reflective of behavioural expressions of particular cognitive abilities, these items are likely to be low in ambiguity, which would lead to less error, and consequently greater validity, in responses.

The Current Study

To the authors' knowledge, there has been no systematic review of the existing studies investigating the accuracy of parent reports of children's cognitive abilities. This paper therefore presents a comprehensive meta-analysis of the accuracy of parent reports of children's cognitive and academic abilities to draw conclusions about the extant research clearly supported by the available data. In addition to synthesising previous study findings to arrive at psychometrically sound estimates of the overall validity of parent reports, potential child-, parent-, and item-level moderators that could influence the size of the correlation between parent reports and children's actual performance were also evaluated.

While it is important to be aware of the child and parent characteristics that influence parent accuracy, these factors are invariably unchangeable. Thus, it is critical to determine the measurement factors that influence parent accuracy. Once this is determined via a meta-analytic review, this information could be used to develop a parent-report scale that reduces the influence of the informant and child characteristics. Such a scale could be used by teachers to obtain an overview of the cognitive profiles of students, or by the students themselves when wanting to develop study strategies that take into account the peaks and troughs of their cognitive profile.

Based on the research reviewed above, the following is hypothesised:

H1: The summary effect size for the relationship between parent reports of children's cognitive ability and performance measures of cognitive ability will be statistically significant and positive.

H2: Significant heterogeneity in the effect sizes will be found, thereby necessitating the investigation of potential moderators.

H3: The validity of parent-reports of female children will be greater than the validity of parent-reports of male children.

H4: The validity of parent-reports from mothers will be greater than the validity of parent-reports from fathers.

H5: The validity of parent-reports obtained from multi-item measures will be greater than the validity of parent-reports obtained from single-item measures.

H6: The validity of parent-reports obtained from measures utilising inter-individual comparisons will be greater than those utilising intra-individual comparisons.

H7: Parent reports based on items that describe cognitive test tasks will have greater validity than parent-reports based on items referring only to cognitive constructs.

A further point to make about current research in this area is that the majority of studies have not been based on the well-established and comprehensive Cattell-Horn-Carroll (CHC) model of cognitive abilities, which encompasses a wide range of human abilities (Flanagan & Dixon, 2013; Schneider & McGrew, 2012). Research that has investigated cognitive-academic relations has highlighted the significance of seven of the 16 CHC broad cognitive abilities currently contained within the model in the successful acquisition of numeracy and literacy skills (Jacobs, Watt, & Roodenburg, 2013). Despite this, the application of CHC theory within the research domain of parent-estimated abilities has been extremely limited. Considering the strong theoretical reputation of this framework, this gap in the literature needs to be addressed.

Method

Information Retrieval Process

The comprehensive literature search was conducted using three electronic databases in the fields of psychology and education: Scopus, PsycINFO, and Web of Science. Relevant research was searched for using combinations of parent terms, report terms, cognitive ability terms, and academic ability terms. A full list of the search terms and how they were combined is provided in the Appendix.

Inclusion and Exclusion Criteria

Any study published in English that investigated the relationship between parent reports and children's actual performance on a standardised cognitive and/or academic achievement test was included. Studies that were conducted in the field (i.e. not case descriptions or computer simulations), and explicitly instructed the parents to rate a child's abilities were retained for inclusion.

Child sample.

Studies that recruited samples comprising of school-aged children (i.e., five to 18 years) were included. Studies that recruited university students or kindergarten children were excluded. Studies were also excluded if child participants were drawn from disordered or clinical populations (e.g., intellectually disabled, acquired brain injury, etc.).

Publication source.

In meta-analyses, the issue of publication bias is often addressed by the inclusion of unpublished studies (e.g., dissertation, conferences papers, etc.). In the present study, the focus was on articles published in scientific journals. This is because the findings of low correlations between parent reports and children's performance do not usually prevent publication as they can still provide meaningful results (i.e., parents are not accurate reporters of children's functioning). As is evident from the wide range of correlations presented in the Results section, this suggests that publication bias is not present in the current dataset. Methods for empirically identifying and assessing the impact of publication bias in the current review are discussed subsequently.

Study Selection Procedure

The first phase of the search was to enter all combinations of search terms in each database, resulting in a total of 13,030 potentially relevant references. The title and abstract of each reference was read by the first author, who decided whether to include the reference on the basis of the inclusion/exclusion criteria. With this selection process, a total of 572 references were identified as potentially including information on the relationship between parent reports and children's cognitive abilities.

In the next step, the selected studies were read and the inclusion/exclusion criteria was applied. Among the 117 studies ascertained to be potentially relevant, 36 studies were excluded as there was no comparison of parent reports to children's actual performance. Five studies did not use a standardised cognitive or academic ability test as the criterion measure, three studies used an age-inappropriate child sample, and four studies were not written in English. These studies, including others that were irrelevant, or did not contain enough information to be coded, were also excluded. As a result of this study selection procedure, 20 studies were included in the present review.

Data Coding

All coding categories are summarised in Table 1. When insufficient information was provided in an article to be able to code a particular aspect, even after attempting to contact the study authors, *not reported* was coded. Relevant research (e.g., Flanagan, Ortiz, & Alfonso, 2013) was consulted to determine whether criterion tests used in studies could be regarded as providing a measure of one of the ten CHC ability areas. When past research could not be located (e.g., not available in English), face validity indicators such as test name and task description were used to determine the CHC ability a particular test measured.

Table 1

Coding Categories for Meta-Analysis of Validity of Parent-Reports of Children's CHC Cognitive Abilities

Gender of child
1 = male
2 = female
3 = mixed
Gender of parent
1= mother
2 = father
3 – mixed
Country
1 = United States of America
2 = United Kingdom
3 = Europe (excluding UK)
4 = Australia
5 = Asia
6 = South America
7 = Africa
Number of items
1 = single-item
2 = multi-item
3 = multi-item
4 = multi-item
Type of comparison
1= intra-individual
2= inter-individual
Parent-report item(s) refer to cognitive construct or cognitive test task
1 = construct
2 = task

Analytical Issues

The correlation coefficient was used to report the effect size for the relationship between parent-report and children's performances on tests of the same ability. The 20 studies included in the meta-analysis reported 70 effect sizes. Several study characteristics were coded as variables with the potential to explain differences in study outcomes. As some studies reported correlation coefficients for different subsamples, multiple effect sizes

were regularly reported in the one study. This presents an issue as most methods for conducting meta-analyses assume independence of effect sizes (Hedges & Olkin, 1980). Several methods were employed during the coding and analysis stages to ensure the independence of effect sizes, and are outlined subsequently.

First, only results for present parent-reports (as opposed to prediction of future academic outcomes) were recorded, as these were considered to be most relevant to the purposes of a parent-report measure designed to assist practitioners with assessment decisions. The second method was to, when possible, run separate analyses for the ten cognitive ability areas being investigated. When neither of these two methods were able to be implemented, then multiple correlations from the one study were averaged.

Results

Effect sizes were analysed using the *Comprehensive Meta-Analysis* software package (Borenstein, Hedges, Higgins, & Rothstein, 2009). The 20 studies included in the analysis of effect sizes are documented in Table 2. The correlation between parent reports and children's performance (*r*) and the size of the children sample (*N*) is reported for each study. The effect sizes ranged from *r* = .005 to .71 (*M* = .40, *SD* = .16). Study sample sizes ranged from 40 to 1,106, and the accumulated sample sizes for all studies included was 5,171. 80% of the included studies did not explicitly state a theoretical framework on which the developed parent-report measure was based.

Table 2

Overview of Studies included in Meta-Analysis of the Validity of Parent Reports of Children's CHC Cognitive Abilities

Study no.	Study author/s	Year pub	Country	Theoretical framework	Child N	Child gender	Parent gender	Child age M (SD)	Number of items	Type of comparison	PR item(s) refer to cognitive construct or task	Ability reported	Ability measured	Effect size (r)
1	Aunola, Nurmi, Lerkkanen et al.	2003	Europe	None stated	52 59	Female Male	Mother Father Mother Father	7.3 (0.32)	Multi	Intra	Con	Gq	Gq	.47 .28 .43 .35
2	Aunola, Nurmi, Niemi et al.	2003	Europe	None stated	52 59	Female Male	Mother Father Mother Father	7.3 (0.32)	Multi	Intra	Con	Grw-R	Grw-R	.70 .57 .61 .64
3	Bouffard & Hill	2005	U.S.	None stated	77	Mixed	Mother	6.22 (0.41)	Multi	Intra	Task	Gq Grw-R	Gq Grw-R	.44 .53
4	Brummelman et al.	2014	Europe	None stated	82	Mixed	Mixed	12.53 (0.45)	Multi	Intra	Con	g	g	.24
5	Chamorro-Premuzic et al.	2006	U.K.	None stated	187	Mixed	Mother Father	14.33 (0.32)	Sing	Inter	Con	g Gq Gv Gc g Gq Gv Gc	g Gq Gv Gc g Gq Gv Gc	.65 .63 .27 .70 .58 .54 .39 .56
6	Cotler & Shoemaker	1969	U.S.	None stated	40	Male	Mother	9.58	Multi	Inter	Task	g	Gv	.61
7	Delgado-hachey & Miller	1993	U.S.	None stated	70	Mixed	Mother	9.5	Sing	Inter	Con	g	g	.52
8	Furnham & Bunclark	2006	U.K.	MI Theory	141	Mixed	Mixed	11.47 (2.21)	Sing	Inter	Con	g	g	.44

Table 2 continued

9	Goforth et al.	2014	U.S.	None stated	747	Mixed	Mixed	Not reported	Multi	Inter	Task	Grw-R Gq	Grw-R Gq	.34 .31
10	Gut et al.	2013	Europe	None stated	402	Mixed	Mixed	6.22 (0.65)	Multi	Inter	Con	Mixed	Gf	.59
11	Herbert & Stipek	2005	U.S.	None stated	378	Mixed	Mixed	6.46 (0.58)	Sing	Inter	Con	Grw-R Gq	Grw-R Gq	.44 .40
12	Hernandez-Torrano et al.	2014	Europe	MI Theory	566	Mixed	Mixed	14.85 (1.08)	Multi	Intra	Task	Gc Gq Gf Gv	Gc Gq Gf Gv	.29 .22 .15 .24
13	Maguin & Loeber	1996	U.S.	None stated	1106	Male	Mother	Not reported	Sing	Inter	Con	Grw-R Gq	Grw-R Gq	.61 .56
14	Miller & Davis	1992	U.S.	None stated	60	Mixed	Mother	9.85	Multi	Intra	Task	Gq Gc Gsm Gv	Gq Gc Gsm Gv	.43 .19 .28 .35
15	Miller et al.	1991	U.S.	None stated	26 24	Mixed	Mother Father Mother Father	8.16 11.25	Multi	Intra	Task	g	g	.71 .50 .44 .40
16	Sommer et al.	2008	Europe	None stated	47 46	Female Male	Mixed	9.10	Multi	Inter	Task	g	Mixed	.54 .48
17	Spinath & Spinath	2005	Europe	None stated	416	Mixed	Mixed	8.70 (1.20)	Multi	Intra	Con	g	Gf	.32
18	Steinmayr & Spinath	2009	Europe	Other (PMA theory)	203 136	Female Male	Mixed	16.95 (7.20)	Sing	Intra	Task	Gc Gq Gv Gf Gc Gq Gv Gf	Gc Gq Gv Gf Gc Gq Gv Gf	.35 .36 .34 .34 .26 .34 .28 .26

Table 2 continued

												g	.50
												Gf	.45
												Gc	.37
					89	Male						Gv	.32
												Ga	.29
												Glr	.33
19	Waschbusch et al.	2000	U.S.	*Gf*-*Gc* Theory			Mixed	8.04 (2.06)	Multi	Intra	Task	Gsm	.19
												g	.47
												Gf	.39
												Gc	.16
					56	Female						Gv	.51
												Ga	.35
												Glr	.08
												Gsm	.005

Note. con = cognitive construct; sing = single-item; multi = multi-item; intra = intra-individual comparison; inter = inter-individual comparison; MI theory = Gardners' Multiple Intelligence Theory; PMA = Thurstone's Primary Mental Abilities theory; g = general intelligence; Gc = crystallised knowledge; Gf = fluid reasoning; Glr = long-term storage & retrieval; Gsm = short-term memory; Ga = auditory processing; Gv = visual processing

If publication bias is present in a meta-analysis, results may over-estimate the effect size due to being based on a biased sample of the target population of studies (Borenstein et al., 2009). The presence of publication bias in the current review was assessed by inspecting the funnel plot (Figure 1), which revealed a moderately symmetrical relationship between the magnitude of effect sizes and their standard errors. This indicates that publication bias is not present in the studies selected for inclusion in this meta-analysis.

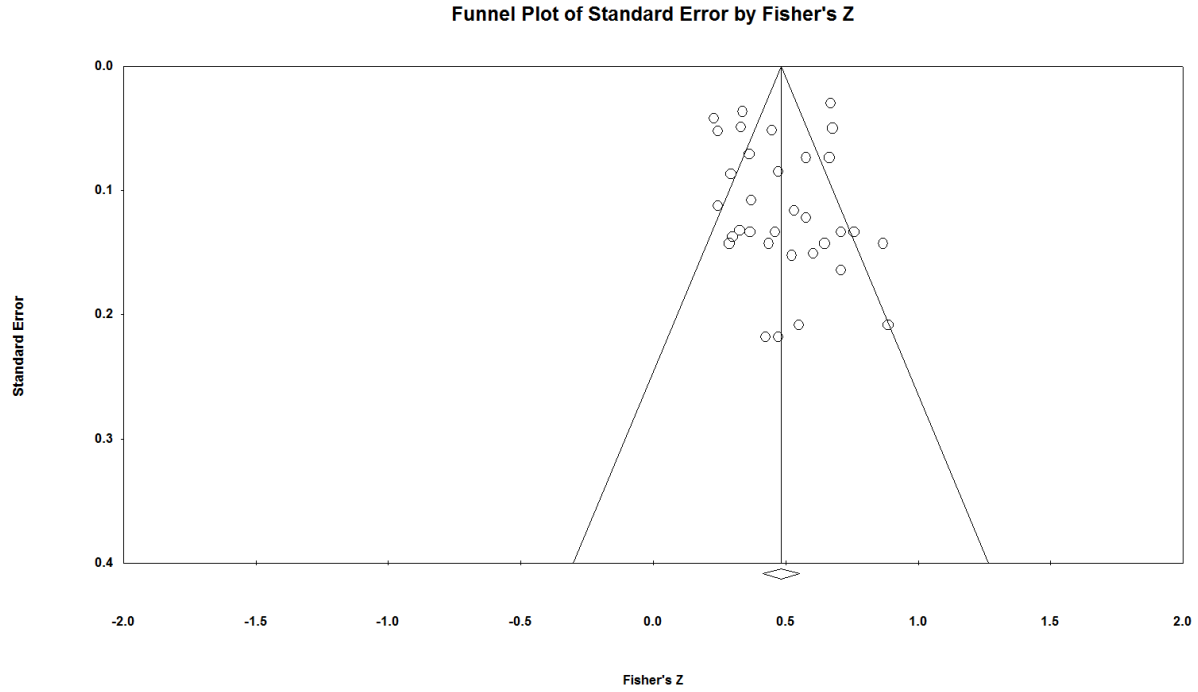

Figure 1. Funnel plot of standard error by Fisher's z

A summary effect size was first computed for all parent-reported cognitive ability areas combined. Multiple effect sizes form the one study were averaged when running this analysis in order to retain independence. The summary effect size was r = .44 with a 95% confidence interval of .37-.51 (p <.001), and heterogeneity of results was present as evidenced by a significant Q-statistic (Q = 155.73, p <.001), thus finding support for Hypotheses 1 and 2. The finding of significant heterogeneity provided support for investigating potential moderators of the observed effect sizes, which is outlined subsequently.

Moderator Analyses

Table 3 presents the results for the moderators tested in this meta-analysis, which were based on parent-reports of all cognitive ability areas combined. Multiple effect sizes from the one study were averaged so as to not violate the assumption of independence of effect sizes. No significant moderating effects were found for the variables of child gender or parent gender; thus Hypotheses 3 and 4 were not supported.

Table 1

Results for Moderator Analysis using Parent-Reports of Cognitive Ability

Group/subgroups	N	k	r	95% CI	Q_b(df)
Child gender	1945	16	.47	.40-.55	.20(1) n.s.
Male	1535	9	.49	.38-.58	
Female	410	7	.45	.33-.57	
Parent gender	2271	19	.53	.48-.58	1.35(1) n.s.
Mother	1812	12	.55	.49-.60	
Father	459	7	.49	.39-.57	
Number of items	5121	32	.46	.41-.51	0.18(1), p= .67
Single	2221	8	.47	.39-.55	
Multi	2900	24	.45	.38-.51	
Type of comparison	5121	32	.45	.40-.50	3.59(1), p= .06
Intra-individual	1957	21	.41	.34-.48	
Inter-individual	3164	11	.51	.43-.58	
Parent-report item(s) based on	5121	33	.44	.39-.48	6.28(1), p= .012
Cognitive construct	3004	17	.49	.43-.55	
Cognitive test task	2117	15	.38	.32-.44	

Note. N = total sample size; k = number of studies; r = correlation coefficient; CI = confidence interval; Q_b = measure of heterogeneity in effect sizes analysed between studies
*p <.05, **p <.001

As for the methodological factors, no significant moderating effects were found for the number of items used (Hypothesis 5). The correlation between parent-reports and children's measured performance was found to be significantly stronger when obtained via reference to cognitive constructs, than those obtained via reference to cognitive tasks (Hypothesis 7). As for type of comparison (Hypothesis 6), results approached conventional significance (p= .06), indicating that measures using inter-individual comparisons showed a trend towards stronger correlations between parent-reports and children's measured performance, than measures using intra-indiviudal comparisons.

Discussion

This study investigated the accuracy of parent-reports of children's cognitive and academic abilities via meta-analysing the extant empirical research. In addition, this study aimed to identify the conditions that promote greater validity in parent-reports of cognitive ability via investigation of potential moderators of the effect size under study. In total, 20 studies reporting 70 independent effect sizes, taken from a total of 5,171 participants, were meta-analysed. The mean correlation between parent reports and children's performance was statistically significant and positive (r = .44, p <.001), thus supporting hypothesis 1. Though this indicates that parents are moderately accurate in their estimations of children's

cognitive abilities, they are far from perfect in their judgments. Additionally, significant heterogeneity between effect sizes was found in the current analysis (supporting hypothesis 2), thus providing support for investigation of potential moderators of the strength of the relationship between parent reports and children's performance.

Previous research has indicated that erroneous parent estimations of children's abilities may be due to individual difference factors such as child and parent gender, and/or methodological limitations of the parent-report measure used in the extant research resulting in greater measurement error due to ambiguous scale items, or lack of a sufficient frame of reference to accurately judge their child's performance (Fenson et al., 1994). Therefore, both individual difference and methodological factors were investigated as potential moderators in the current study.

Hypotheses 3 and 4 were not supported as both individual difference variables investigated were not found to be significant moderators in the current meta-analysis, indicating that neither the gender of parent informants nor gender of the rated child had significant influence on parent-report accuracy. Although previous research has shown that fathers provide more inaccurate estimations of children's cognitive ability than mothers (Chamorro-Premuzic et al., 2009), and gender stereotypical judgments are prevalent within the existing literature, these assumptions were not supported by the present data. These results indicate that idiosyncrasies of individual studies within the existing parent-report literature may have caused significant effects of gender to be found at times. When applying a more robust method of inquiry such as meta-analysis, however, these differences disappear. As actual intelligence is not affected by either child or parent gender, likewise, such extraneous variables should not influence the measurement process via parent-report method.

Unexpectedly, the number of items (single vs. multiple) on a parent-report measure was not found to be a significant moderator, thus hypothesis 5 was not supported. Multi-item measures have consistently been found to be more reliable and valid than single-item measures in a number of ways including the capacity for computing correlations between items to establish internal consistency, as well as being more likely to tap all facets of the construct of interest (Bergkvist & Rossiter, 2007; Baumgartner & Homburg, 1996). Further, meta-analyses conducted in the self-estimates of intelligence research domain have shown that reports obtained via multi-item measures have greater validity than single-item measures (Jacobs, 2012). Since cognitive abilities are framed as multi-faceted constructs within CHC theory, as exemplified by the hierarchical structure of broad cognitive abilities being subsumed by narrow cognitive abilities (Schneider & McGrew, 2012), this suggests that adequate construct representation of cognitive abilities would be best ensured by multi-item measures.

However, that single item measures were found to be as reliable as multi-item measures could have resulted from the fact that respondents were reporting on someone

other then themselves (in this instance their child). When individuals are asked to rate themselves using psychological scales it is well-known that social desirability can influence responses such that results turn out to be overly positive (van de Mortel, 2008). However, results of the current study seem to indicate that protections against the effects of socially desirable responding are not required when asking parents to report on their children, and that rather there can be economy of scale in this area of research and practice. Nonetheless, given that causality cannot be inferred from the findings of significant moderation in meta-analyses (Hall & Rosenthal, 1991), which is explored further below, this finding needs to be investigated further in future primary studies.

While not reaching a conventional statistical significance level (i.e., $p < .05$), results of the current meta-analysis do indicate that using inter- as opposed to intra-individual comparisons in parent-report measures are an important measurement condition that is favourable to valid estimations of children's cognitive ability. Partial support was thus found for hypothesis 6. This is consistent with past research within the self-report domain (Freund & Kasten, 2012; Jacobs, 2012; Mabe & West, 1986), where self-reports of cognitive ability based on inter-individual comparisons were found to be more valid than intra-individual comparisons. Thus, it is important that future parent-report studies endeavour to use social comparison terminology in the instructions of the parent-report measure to improve the validity of estimations. The conclusion that parents cannot provide valid judgments regarding their child's cognitive ability may be erroneously reached if future studies do not provide the measurement conditions most conducive to validity.

In contrast to expectations, items that referred to cognitive constructs were found to provide more valid estimations compared to cognitive test tasks, thus no support was found for hypothesis 7. This is inconsistent with research within the self-report domain that has found that providing respondents with concrete behavioural examples of cognitive abilities leads to greater accuracy in reports than an abstract definition of a construct. This has been speculated to occur due to a reduction in the ambiguity of items, which in turn reduces the amount of measurement error present (Jacobs, 2012). Additionally, the scale designed by Waschbusch et al. (2001) had used specific cognitive tasks based on G*f*-G*c* theory (a predecessor of CHC theory) in their item descriptions, and found that parents could report the cognitive strengths and weaknesses of their children with some degree of specificity. Failure to find evidence for greater validity of parent-reports obtained via item reference to cognitive test tasks could be due several limitations of the current study, as elaborated further below.

While results of the current study suggest that measures using single items referring to cognitive constructs may be sufficient for validly measuring children's cognitive ability via parent-report methods, it is important to be cognisant of the fact that a causal role cannot be inferred for moderators identified via meta-analysis. This is because investigation of moderator variables in meta-analyses does not include random allocation of studies to

different conditions, resulting in the possible existence of other systematic differences between these groups other than the type of response format, with these additional differences being indistinguishable from those brought about by the moderator variable (Cooper & Lemke, 1991).

Additionally, the majority of included studies (80%) did not use an established, well-validated theoretical framework of cognitive abilities. In these studies, raters were either asked to predict a child's performance on objective measures (e.g., Miller et al., 1991), or to make judgments on overall cognitive or academic ability alone (e.g., Aunola et al., 2003). Further, parent-report scales that have been built upon the theoretical foundation of less well-validated cognitive ability theories such as Gardner's (1983) theory of Multiple Intelligence (MI theory; e.g., Furnham, 2000) are prevalent in the extant parent-report literature. While this framework has had considerable appeal from an educational perspective (Chen, 2004), there has been no empirical evaluation of its validity as a whole (Allix, 2000), and it has been found to have inadequate support (Waterhouse, 2006). This indicates that not only should caution be used when making conclusions about the accuracy of parent-reports from studies using these theories, but that there is a significant limitation in the extant literature within this domain; that items on parent-report measures used in the extant research could have been reflecting inadequate coverage or irrelevant aspects of cognitive abilities. Thus, the development of measures based on well-validated theoretical models, such as CHC theory, is needed to provide insight regarding the moderating effect of whether items refer to specific cognitive tasks on the validity of parent-reports of children's cognitive ability.

Additionally, due to the lack of studies that included the targeted moderator variables, not all studies could be included in the moderator analysis. The person variables and measurement conditions examined in this review thus do not comprise an exhaustive list of factors that may potentially influence the validity of parent-reports of children's cognitive ability. Rather, they merely constitute the factors represented in the available parent-report literature. Further, the majority of studies included in the current review (95.65%) were conducted in western countries, thereby limiting the generalisability of the results to non-western populations.

Despite this, the current study has provided important insights into the accuracy of parent-reports of children's cognitive abilities for both research and practical perspectives. The results should caution researchers about which instrument to use when assessing parent estimations, as this is likely to have an effect on the validity of the findings. Further, future parent-report measures of children's cognitive ability should be developed based on well-validated theories that contain robust theoretical constructs such as the CHC model. Using such a theory as the basis for scale development helps to decrease construct-irrelevant variance by ensuring only items relevant to the construct are included, and that

the likelihood of construct under-representation is reduced by adequate coverage of the key aspects of the cognitive ability construct (Clark & Watson, 1995; DeVellis, 2012).

From a practitioner's perspective, the results indicate that parents can be a relatively reliable source of information regarding a child's cognitive functioning. Information from parents can be a valuable addition to the assessment process, and their involvement provides them with an opportunity to share unique information about their child (Diamond & Squires). Parents also offer the advantage of providing information about specific types of behaviours, in a variety of settings, over a longer time than is available to the examiner during the formal assessment process (Bagnato, Neisworth, & Munson, 1989). It is thus imperative that the development of future parent-report scales are grounded in a well-validated cognitive theory, with measurement conditions that are favourable to valid estimations of children's cognitive abilities.

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Appendix

Search terms used in systematic literature search of online databases

No.	Search terms	Results (Retained)		
		Scopus	Web of Science	PsycINFO
1.	parent* belie* and academic abilit*	58 (5)	86 (12)	5 (2)
2.	parent* belie* and academic perf*	99 (2)	32 (7)	5 (0)
3.	parent* belie* and cogniti* abilit*	77 (5)	136 (10)	10 (7)
4.	parent* belie* and intell*	181 (5)	159 (22)	42 (4)
5.	parent* belie* and IQ	42 (6)	64 (15)	15 (6)
6.	parent* estimat* and academic abilit*	27 (3)	37 (4)	0 (0)
7.	parent* estimat* and academic perf*	106 (3)	160 (4)	0 (0)
8.	parent* estimat* and cogniti* abilit*	93 (6)	151 (5)	3 (1)
9.	parent* estimat* and intell*	208 (23)	22 (14)	31 (20)
10.	parent* estimat* and IQ	114 (12)	18 (12)	14 (8)
11.	parent* evaluat* and academic abilit*	91 (1)	135 (3)	0 (0)
12.	parent* evaluat* and academic perf*	221 (2)	167 (3)	5 (0)
13.	parent* evaluat* and cogniti* abilit*	144 (0)	124 (0)	1 (0)
14.	parent* evaluat* and intell*	523 (5)	314 (1)	35 (2)
15.	parent* evaluat* and IQ	158 (1)	119 (1)	4 (0)
16.	parent* judg* and academic abilit*	11 (2)	22 (4)	0 (0)
17.	parent* judg* and academic perf*	26 (3)	37 (3)	2 (0)
18.	parent* judg* and cogniti* abilit*	45 (4)	36 (3)	4 (1)
19.	parent* judg * and intell*	59 (2)	43 (4)	6 (0)
20.	parent* judg* and IQ	42 (3)	33 (5)	0 (0)
21.	parent* perce* and academic abilit*	122 (8)	202 (15)	5 (2)
22.	parent* perce* and academic perf*	342 (7)	52 (5)	48 (1)
23.	parent* perce* and cogniti* abilit*	224 (2)	174 (6)	26 (6)
24.	parent* perce* and intell*	443 (10)	87 (9)	165 (14)
25.	parent* perce* and IQ	129 (7)	274 (15)	21 (4)
26.	parent* rat* and academic abilit*	133 (3)	27 (4)	3 (1)
27.	parent* rat* and academic perf*	386 (9)	79 (2)	54 (1)
28.	parent* rat* and cogniti* abilit*	317 (4)	95 (4)	214 (6)
29.	parent* rat* and intell*	171 (9)	210 (9)	829 (11)
30.	parent* rat* and IQ	72 (7)	117 (7)	194 (1)
31.	parent* report* and academic abilit*	145 (2)	218 (5)	10 (2)
32.	parent* report* and academic perf*	101 (5)	173 (1)	103 (3)
33.	parent* report* and cogniti* abilit*	364 (3)	280 (4)	230 (3)
34.	parent* report* and intell*	276 (2)	192 (3)	825 (4)
35.	parent* report* and IQ	108 (4)	198 (4)	190 (1)
	RETAINED	180	225	111
	REMOVED DUPLICATES	52	81	71
	TOTAL TO SCREEN ABSTRACTS			119

Personality and "Eco-Type":

Using the Big Five to predict combinations of eco-attitudes and eco-behaviours

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Research regarding personality traits and pro-environmental characteristics is inconclusive, and has largely focused solely on the Active Green individual. In the present study, Big Five personality traits were examined in relation to what we have called eco-type group membership. Three hundred participants aged 18-86 years (M = 37.92, SD = 15.27) completed the Mini-International Personality Item Pool, the New Ecological Paradigm Scale, and the Pro-Environmental Behaviour Scale. Eco-types were created using a median split for a high-low dichotomy for eco-attitudes and eco-behaviours. Active Greens were identified by high eco-attitudes and high eco-behaviours, Passive Greens by high eco-attitudes, though low eco-behaviours, Non-Greens by low eco-attitudes and eco-behaviours, and Honeybees by their lack of eco-attitudes yet strong eco-behaviours. Findings of a multinomial logistic analysis indicate that Openness to Experience, Agreeableness, and Neuroticism significantly predict eco-type group membership. In reference to Active Greens, Passive Greens were distinguished by lower Openness to Experience and Non-Greens were distinguished by lower Agreeableness and Neuroticism. This has implications for understanding driving forces behind environmentalism, and for developing effective behavioural interventions.

Climate change is predicted to have massive and widespread consequences for global, societal, and individual health (Watts et al., 2015). Environmental scientists are calling for immediate action at the societal and individual level, to mitigate these effects (Watts et al., 2015). Presently, much of the research on personality and pro-environmentalism has focused on the *Active Green* individual, exploring personality traits associated with strong eco-attitudes and the eco-behaviours consistent with these reported attitudes. While this research is promising, a consensus has not yet been reached. There is also a noticeable lack of research on the personality traits associated with other combinations of eco-attitudes and eco-behaviours or, what we have called, *eco-types*. In addition to the Active Greens described above, eco-types include: *Passive Greens*, who report high eco-attitudes and yet low eco-behaviours, *Non-Greens*, with low eco-attitudes and eco-behaviours, and *Honeybees*, so named because, like honeybees, in pursuit of their own goals (producing honey), they incidentally perform another valuable service (pollination). That is, despite a lack of eco-attitudes, the Honeybee's life involves many eco-behaviours (see Gifford, 2011). This research is vital, as it highlights the *attitude-behaviour gap*—the notion that strong eco-attitudes alone do not necessarily entail equally strong eco-behaviours—which is the target of eco-behavioural interventions.

The Big Five is the dominant personality model in psychology (O'Boyle, Forsyth, Banks, Story, & White, 2015). This model is comprised of five factors: Openness to Experience;

Agreeableness; Neuroticism; Conscientiousness; and Extraversion, with each trait comprised of six lower-order facets (Johnson, 2014). The model has many strengths: it is cross-culturally valid; it is widely used; and the factor and facet levels in the model allow findings at a factor level to be easily understood and extended (O'Boyle et al., 2015).

With regard to eco-attitudes, evidence is strongest for a relationship with the personality trait Openness to Experience. Openness to Experience has been associated with measures of eco-attitudes and environmental concern in a number of recent studies (Hirsh, 2010; Hirsh & Dolderman, 2007; Markowitz, Goldberg, Ashton, & Lee, 2012; Wuertz, 2015). Openness to Experience, particularly the Intellect facet, relates to an affinity for abstract and philosophical thinking (Johnson, 2014). This characteristic may aid in overcoming "ancient brain", a term coined by Gifford (2011) to refer to humanity's tendency to focus on what is immediate in time and close in proximity, thus facilitating a greater understanding of the abstract notion of climate change and subsequent higher eco-attitudes (DeYoung, Peterson, & Higgins, 2005; Gifford, 2011; Hirsh, 2010). Research evidence for an association between Agreeableness and eco-attitudes may be explained by a higher incidence of self-transcendent values (altruistic values and concern for others; Hirsh, 2010; Hirsh & Dolderman, 2007; Olver & Mooradian, 2003; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). There is some limited evidence for a relationship between environmental concern (an aspect of eco-attitudes) and Conscientiousness and Neuroticism, potentially related to the greater social investment associated with Conscientiousness and the Anxiety characteristic of a Neurotic personality (Hirsh, 2010; Johnson, 2014; Lodi-Smith & Roberts, 2007). Recent studies do not support an association between Extraversion and eco-attitudes.

Research regarding personality traits and eco-behaviours have produced conflicting findings. While there is evidence for a positive relationship between eco-behaviours and Openness to Experience (Markowitz et al., 2012; Wuertz, 2015), relationships with other personality traits are less clear. Those high on Openness to Experience may have a lower attachment to routine and habit, facilitating positive behaviour change and underpinning the observed associations with eco-behaviours. This is supported by associations observed between Openness to Experience and health-promoting behaviours in recent research (see Lunn, Nowson, Worsley, & Torres, 2014; Tiainen, Männistö, Lahti, Blomstedt, Lahti, Perälä et al., 2013; Wilson & Dishman, 2015). Agreeableness, Conscientiousness, Neuroticism, and Extraversion have been found to be associated with measures of specific eco-behaviours, though it is unknown whether these relationships extend to general eco-behaviours (see Fraj & Martinez, 2006; Milfont & Sibley, 2012; Swami, Chamorro-Premuzic, Snelgar, & Furnham, 2011). A relationship between Agreeableness and eco-behaviours is supported by research concluding that an "other-oriented" nature is related to more responsible resource consumption, and that Agreeableness is associated with lower consumerist behaviour (Arnocky, Stroink, & DeCicco, 2007; Hirsh & Dolderman, 2007).

Clarifying the relationships between eco-types and personality traits is vital, not only for understanding the personality associated with an Active Green individual, but also to

better understand potential reasons why individuals may have low eco-attitudes or eco-behaviours as in the Passive Green, Non-Green, and Honeybee groups.

The eco-types offer a pathway towards understanding the relationships among personality traits, eco-attitudes, and eco-behaviours in a manner that offers practical benefits, such as offering insight into pro-environmental motivations and barriers. The eco-types also allow for a broader focus than has been seen thus far. The present study aims to examine the role of personality traits in differentiating between eco-types – Active Greens, Passive Greens, Non-Greens, and Honeybees. We expect that Openness to Experience will be associated with eco-types with high eco-attitudes or high eco-behaviours (i.e., Passive Greens, Active Greens, and Honeybees). We also pose the research question: will Agreeableness, Conscientiousness, Neuroticism, and Extraversion predict eco-type group membership and differentiate eco-types?

Method

Participants

Of the 300 participants, 166 (55.33%) identified as female, 118 (39.33%) as male, four (1.33%) as non-binary, and 12 (4%) did not provide a gender. This sample ranged in age from 18 to 86 years (M = 37.92, SD = 15.27). Age was not provided by seven participants. A bimodal age distribution was evident, with peaks in the 20- to 25-year age group, and 50- to 55-year age group. Participants were recruited through social media for a convenience sample. Participation was voluntary, anonymous, and uncompensated. Informed consent was indicated by completion of the questionnaire. Participants were required to be aged over 18 years. There were no other inclusion or exclusion criteria.

Materials

Demographic information. A demographic questionnaire allowed for information regarding age and gender to be obtained.

Personality. The Mini-International Personality Item Pool (Mini-IPIP; Donnellan, Oswald, Baird & Lucus, 2006) is a 20-item scale comprised of five 4-item subscales, measuring each of the Big Five personality factors. All responses are recorded on a 5-point Likert Scale from 1 (*very inaccurate*) to 5 (*very accurate*). Each subscale has been shown to have good internal consistency (see Cooper, Smillie, & Corr, 2010), and high test-retest reliability (see Donnellan et al., 2006). As the scale developers aimed to create five distinct subscales, whole-scale internal consistency has not been reported (Donnellan et al., 2006). Convergent validity with the 120-item International Personality Item Pool-Neuroticism, Extraversion, and Openness measure (IPIP-NEO; Johnson, 2014) is considered reasonable (r = .52-.73; Donnellan et al., 2006).

Eco-attitudes. The New Ecological Paradigm Scale (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000), is a revision of the New Environmental Paradigm Scale (Dunlap & Van Liere, 1978, as cited in Dunlap et al., 2000). The 15-item measure assesses an individual's proenvironmental orientation, or eco-attitudes, by examining five interrelated facets: (a) balance of nature (and its fragility; the ability of humanity to upset it); (b) limits to growth

(the existence of a limit for human societies); (c) antianthropocentrism (rejection of the belief that humans are the most important beings on Earth); (d) anti-human exemptionalism (rejection of the notion that humans are exempt from constraints of nature); and (e) ecocrisis (the belief in the likelihood of potentially catastrophic environmental changes).

All responses are recorded on a 5-point Likert Scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The NEP has been found to have good internal consistency (Cronbach's α = .83; Dunlap et al., 2000). Convergent validity has been demonstrated with significant correlations with measures of perceived seriousness of world ecological problems (*r* = .61) and of support for pro-environmental policies (*r* = .57; Dunlap et al., 2000). More recently, Hawcroft and Milfont (2010), after a systemic review of the NEP's use, recommended it continue to be used for research on eco-attitudes.

Eco-behaviours. The 19-item Pro-Environmental Behaviour Scale (PEBS) was developed by Markle (2013) to assess eco-behaviours identified as having a high environmental impact. The PEBS measures four categories of eco-behaviours: conservation, environmental citizenship, food, and transportation. Each subscale has been found to have reasonable internal consistency, and moderate to high test-retest reliability (see Markle, 2013). The overall scale has been shown to have good internal consistency (Cronbach's α = .80) and high test-retest reliability (*r* = .85; Markle, 2013). Response formats include Likert scales, dichotomous yes-no, and categorical responses. Response choices for item 13, regarding the fuel efficiency of the participant's vehicle, were altered for the present study to cater to participants who do not know their vehicle's fuel efficiency, who do not drive a vehicle, or who are not familiar with the US measurements in the original scale.

Procedure

The research proposal was approved by the RMIT Human Research Ethics Committee. Prospective participants were directed to the online questionnaire from a dedicated social media page. A plain language statement (PLS) displayed before participants were invited to complete the questionnaire, providing information regarding the study, requirements of participation, rights of participants, and ethical considerations. Participants were required to confirm they had read the PLS, were over 18 years old, and wished to proceed to the questionnaire before continuing.

Results

Data Preparation

Data were entered into the Statistical Package for the Social Sciences (SPSS) version 23 for analysis. Item 13 of the PEBS was omitted due to limitations regarding responses, scoring, and applicability to a modern global population. The difference in eco-behaviour mean scores with and without item 13 was negligible. Eco-types were computed using a median split for eco-attitude and eco-behaviour scores (See Figure 1).

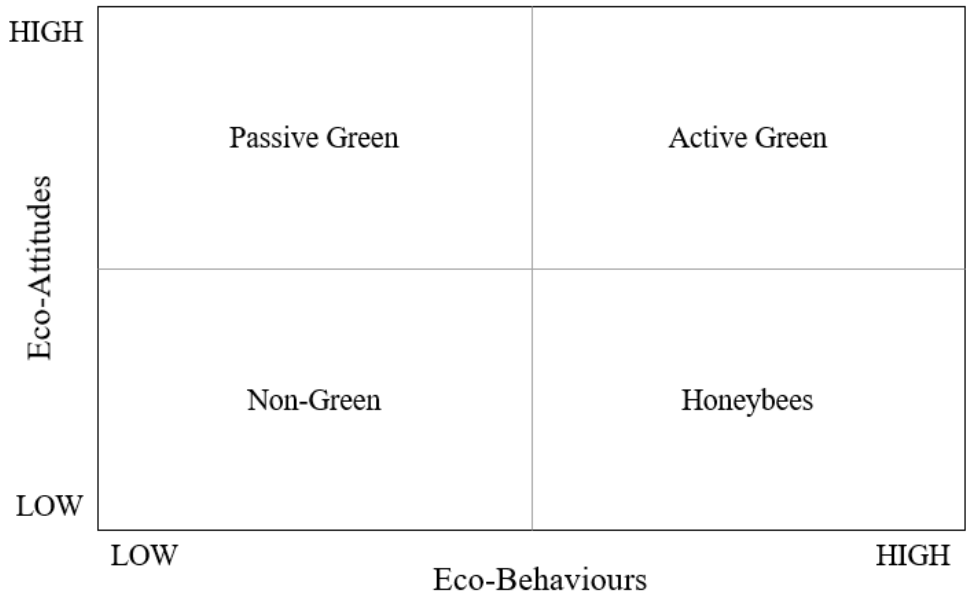

Figure 1. Eco-types identified by splitting eco-attitudes and eco-behaviour scores at the median to create a high/low dichotomy.

Descriptive Statistics

Descriptive statistics for personality traits, eco-attitudes, and eco-behaviours are reported in Table 1 for the total sample and separate eco-types. Some differences in personality traits between eco-types are evident: the Active Greens had the highest Agreeableness scores; the Passive Greens scored lowest in Extraversion and Openness to Experience, but highest in Neuroticism; the Non-Greens scored lowest in Agreeableness and Neuroticism; and the Honeybees scored highest in Extraversion and Openness to Experience. Eco-attitudes were typically stronger than eco-behaviour.

Table 1.

Descriptive Statistics for Personality Traits and Ecological Variables

		Eco-Types			
	Total Sample	Non-Green	Passive Green	Active Green	Honeybees
	N = 300	*n* = 91	*n* = 46	*n* = 94	*n* = 46
Variables	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Personality Traits					
Openness to Experience	15.71 (3.03)	15.33 (3.12)	14.82 (3.61)	16.23 (2.60)	16.65 (2.39)
Agreeableness	15.91 (2.87)	14.85 (3.12)	15.98 (2.92)	16.66 (2.48)	16.43 (2.88)
Neuroticism	11.54 (3.69)	10.52 (3.24)	12.63 (3.55)	11.98 (4.12)	11.20 (3.58)
Conscientiousness	13.55 (3.26)	13.26 (3.47)	13.02 (3.36)	13.99 (3.12)	13.89 (3.38)
Extraversion	12.49 (3.58)	12.49 (3.63)	11.54 (3.83)	12.29 (3.53)	13.46 (3.28)
Ecological Variables					
Eco-Attitudes	57.32 (9.43)	47.87 (7.86)	65.48 (4.39)	64.78 (4.07)	52.42 (4.10)
Eco-Behaviours	57.44 (11.15)	47.48 (6.61)	48.71 (6.14)	67.46 (6.44)	65.59 (5.92)

Note. Personality was assessed using the Mini-International Personality Item Pool; eco-attitudes were assessed using the New Ecological Paradigm Scale; and eco-behaviours were assessed using the Pro-Environmental Behavior Scale.

Personality Traits Differentiating Eco-Types

A multinomial logistic regression (MLR) analysis was conducted to investigate the influence of personality traits on membership of eco-type groups. This analysis was justified as the classification accuracy rate for the model (47.3%) was more than a 25% increase on the proportion by chance accuracy rate (27.8%). The Active Green eco-type was chosen as a reference group, as this is the exemplar eco-type to which others can be compared. Active Green and Non-Green eco-types were most accurately classified (69.1% and 63.7% respectively), while Passive Green and Honeybee eco-types had lower correct classification (15.2% and 2.2% respectively). Therefore, the model is most accurate for Active Green and Non-Green eco-types.

Openness to Experience, Agreeableness, and Neuroticism were significant predictors of eco-type membership (see Table 2), with the Non-Green eco-type significantly differentiated from Active Green by Agreeableness and Neuroticism, and the Passive Green eco-type differentiated by Openness to Experience. No personality trait significantly differentiated Honeybees from Active Greens. The regression coefficient and parameter estimates for these personality traits are reported in Table 3.

Table 2.
Likelihood Ratio Tests for Eco-Types

Effect	Chi-square	*df*
Intercept	29.59	3
Openness to Experience	12.56	3
Agreeableness	15.35	3
Neuroticism	9.72	3
Conscientiousness	6.04	3
Extraversion	4.96	3

Note. Personality was assessed using the Mini-International Personality Item Pool.

Table 3.

Multinomial Logistic Regression Coefficient and Parameter Estimates for Eco-Type

						95% Confidence Interval for Odds Ratios	
Eco-Type	Personality Traits	*B* (*SE*)	Wald	Sig.	Odds Ratio	Lower	Upper
Non-Green	Intercept	7.18 (1.65)	18.85	<.001			
	Openness to Experience	-.10 (.06)	2.97	.085	0.91	0.82	1.01
	Agreeableness	-.21 (.06)	12.88	<.001	0.81	0.72	0.91
	Neuroticism	-.12 (.05)	6.60	.010	0.89	0.82	0.97
Passive Green	Intercept	4.33 (1.94)	4.99	.026			
	Openness to Experience	-.17 (.06)	6.95	.008	0.85	0.75	0.96
	Agreeableness	-.06 (.05)	0.77	.382	0.94	0.82	1.08
	Neuroticism	.03 (.05)	0.25	.619	1.03	0.92	1.14
Honeybees	Intercept	-1.16 (2.02)	0.33	.565			
	Openness to Experience	.07 (.07)	0.89	.346	1.07	0.93	1.22
	Agreeableness	-.07 (.07)	0.89	.347	0.93	0.81	1.08
	Neuroticism	-.04 (.05)	0.59	.442	0.96	0.87	1.07

Note. The reference group is Active Green. Personality was assessed using the Mini-International Personality Item Pool.

B = unstandardised regression coefficient

Given the other variables are held constant, in comparison with the Active Green eco-type, lower Agreeableness and Neuroticism were associated with increased odds of Non-Green eco-type membership, whereas lower Openness to Experience was associated with increased odds of Passive Green eco-type membership. No significant relationships were observed for Honeybees in relation to the Active Green eco-type. These relationships are represented in Figure 2.

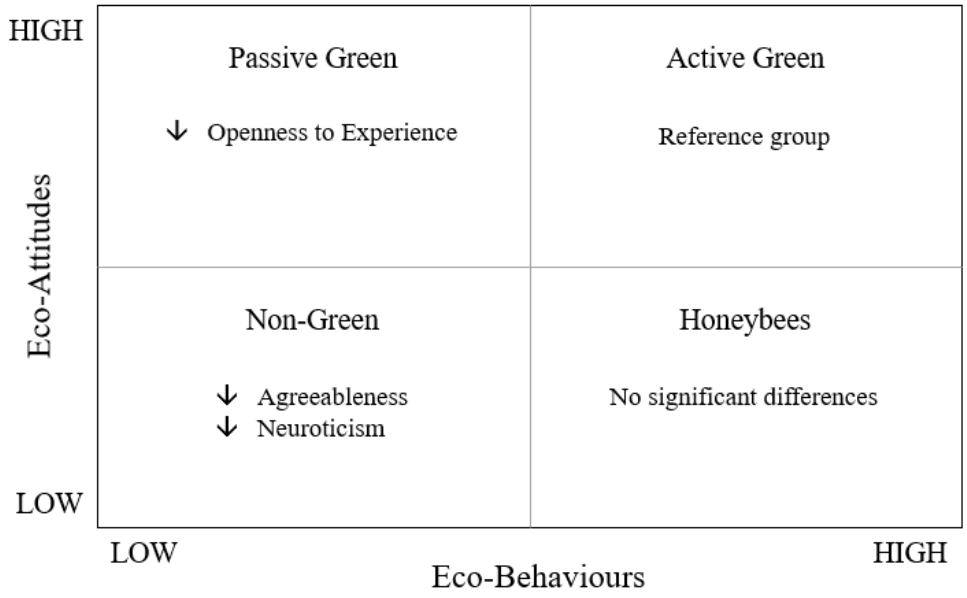

Figure 2. Differences in eco-type personality traits in reference to the Active Green eco-type.

Discussion

The present study aimed to explore the role of personality traits in differentiating eco-types. Predicting combinations of eco-attitudes and eco-behaviours in this way extends the focus of existing research, opens pathways for future research, and offers practical benefits for eco-behavioural interventions.

Our expectation that Openness to Experience would be associated with groups of high eco-attitudes or high eco-behaviour (i.e., Passive Greens, Active Greens, and Honeybees) was partially supported by the findings. Openness to Experience significantly contributed to the prediction of eco-type group membership. Openness to Experience differentiated the Passive Green eco-type from the Active Green reference group, with lower Openness associated with increased odds of being a Passive Green rather than Active Green eco-type. Openness to Experience did not significantly differentiate Non-Green or Honeybee eco-types from Active Greens, contrasting with previous research evidencing relatively consistent relationships between Openness and eco-attitudes. However, given that Openness did differentiate Passive Greens from Active Greens, which differ only by strength of eco-behaviours, findings suggest that Openness to Experience relates to performing eco-behaviours with ecological motivations.

Regarding the role of Agreeableness, Conscientiousness, Neuroticism, and Extraversion in eco-type prediction and differentiation, results are promising. The findings show that in addition to Openness to Experience as hypothesised, Agreeableness, and Neuroticism also significantly contributed to the prediction of eco-type. Some prior research findings offer support for the predictive power of Agreeableness (Hirsh, 2010; Hirsh & Dolderman, 2007). There is limited prior evidence to support the relationship between Neuroticism and eco-type, although theoretical links relating to the concern and anxiety aspects of Neuroticism support the observed relationship (see Hirsh, 2010).

While Openness to Experience distinguished Passive Greens from Active Greens as hypothesised, Agreeableness and Neuroticism distinguished the Non-Green eco-type from the Active Green reference group. This indicates that aspects of Agreeableness and Neuroticism may be the most important traits in distinguishing Active Green environmentalist individuals from Non-Green individuals. Interestingly, the analysis did not show any difference in prediction of Honeybees in reference to the Active Green reference group. This may be due to the poor model fit for the Honeybee eco-type, potentially due to confounding variables such as non-ecological motivations.

The relationship between Openness to Experience and the Passive Green eco-type, in reference to the Active Green eco-type, suggests that Openness to Experience plays a role in facilitating the performance of eco-behaviours stemming from eco-attitudes. This may be attributed to a lower attachment to routine and habit—known barriers to eco-behaviours—facilitating positive lifestyle change (Gifford, 2011; Kollmuss & Agyeman, 2002). Findings indicate that a combination of high Agreeableness and Neuroticism distinguishes the Active Green eco-type from the Non-Green eco-type. The observed relationships are possibly influenced by an interplay among global, societal, and egotistic concern for the future, stemming from a combination of high Agreeableness and Neuroticism. In addition, aspects of Agreeableness (e.g. cooperation, focus on relationships with others), and of Neuroticism (e.g. self-consciousness, anxiety) may relate to a higher adherence to social norms, potentially increasing eco-attitudes and eco-behaviours (Clark, Kotchen, & Moore, 2003; Hirsh, 2010; Pensini, Slugoski, & Caltabiano, 2012). Agreeableness has been associated with self-transcendent values (reflecting a selfless concern for collective interests and well-being), which have in turn been associated with eco-attitudes (Olver & Mooradian, 2003; Steg et al., 2014).

It is important to note potential issues regarding the chosen methodology for this study. The use of median splits and the practice of creating categorical variables from continuous data is polarising, and has stimulated much debate (see Pham, 2015). The present study has met the conditions outlined by Iacobucci, Posavac, Kardes, Schneider, and Popovich for statistical integrity when dichotomising continuous variables (see Pham, 2015). Future research could explore measurement of the eco-types and better establish reliability and validity for this classification to ensure its usefulness. It would be beneficial to expand future study designs to also examine information regarding barriers, catalysts, and

motivations to better understand the underlying mechanisms of eco-type group membership.

The eco-types, developed for the current study, offer a unique way of examining different combinations of eco-attitudes and eco-behaviours. It is hoped that this system will aid a shift towards consideration of individual factors when developing eco-behavioural interventions. Considering the personality of the eco-types and adopting a more tailored approach in developing an eco-behavioural intervention may increase efficacy and improve outcomes. For example, if tailoring an intervention for individuals in the Passive Green eco-type, consideration could be given to the source of eco-attitudes, and the factors hindering performance of eco-behaviours. An eco-behavioural intervention could then appeal to a concern about effects of climate change on future generations, whilst campaigning for eco-behaviours which can easily be adapted into existing routines.

Openness to Experience, Agreeableness, and Neuroticism significantly aided prediction of eco-type membership, indicating that these traits have the most practical relevance in this field of research. Personality trait differentiation between eco-types show that Agreeableness and Neuroticism are most relevant for pro-environmentalism through higher eco-attitudes, while higher Openness to Experience may facilitate eco-behaviours motivated by eco-attitudes. These findings could inform future research regarding other influencing factors, in addition to development of more effective and tailored eco-behavioural interventions.

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Making meaning of knowing: An exploratory case study

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Questions central to the concept of knowledge, including what it means to know something and how we come to know and justify it, have long been studied and debated by philosophers and educational psychologists. The aim of this study was to explore and understand the meaning of experiences of knowing from the perspective of the layperson, that is, the individual "knower". This case study reports on the experiences of Angela, a business owner in her 50s from a large Australian city. Angela participated in a semi-structured interview that explored her experiences of knowing in relation to topics such as work, environmental and social concerns, and personal interests. The interview data were analysed using Interpretative Phenomenological Analysis (IPA), which identified five superordinate themes: (a) motives to know, (b) influences on knowing, (c) outcomes of knowing, (d) knowing that you know, and (e) coming to know. After briefly discussing the first four superordinate themes, this article then focuses on "coming to know", which for Angela relates to the ways that knowledge is gained, sourced or represented. Implications are discussed in light of current literature in the field.

What does it mean 'to know' something? And how do you come to know it? These questions stem from study in the area of epistemic cognition, or 'Ways of Knowing', which considers the ways in which an individual's perspectives on the nature, sources, justification and limits of knowledge influence various outcomes (Franco et al., 2012). In particular, an individual's approach to knowledge and knowing has long been claimed to have implications in both academic and non-academic realms (Hofer, 2016). These implications include how one approaches learning tasks (Schommer, 1990), lifelong learning (Bath & Smith, 2009) and juror reasoning (Kuhn, 2001; Weinstock & Cronin, 2003), evaluates information online (Bråten, Strømsø, & Samuelstuen, 2005) or in the news (Hofer & Bendixen, 2012) and makes health choices (Kienhues & Bromme, 2012) or political decisions (Hofer, 2004a). Additionally, these implications include how an individual evaluates, understands, interprets and evaluates scientific claims (Sinatra, Kienhues & Hofer, 2014) and knowledge claims including those related to wider societal concerns such as climate change (Bråten, Britt, Strømsø, & Rouet, 2011).

However, the issue of how to name, define, conceptualise, and measure this construct has long been the subject of research and debate (Briell, Elen, Verschaffel, & Clarebout, 2011; Greene, Azevedo, & Torney-Purta, 2008; Hofer, 2016; Hofer & Bendixen, 2012; Schraw & Olafson, 2008). The use of instruments with significant psychometric problems (Buehl, 2008; Clarebout, Elen, Luyten, & Bamps, 2001; DeBacker, Crowson, Beesley, Thoma, & Hestevold, 2008; Schraw & Olafson, 2008; Wood & Kardash, 2002) has

further added to the field's issues and raises fundamental questions regarding associations purported between scores on epistemic cognition measures and various outcome variables (Greene & Yu, 2014; Mason, 2016). With little resolution of these key issues to date, it is clear that until such questions are answered and debates resolved, progress in the field will be hampered (Greene et al., 2008).

Arguably, the field will advance and benefit through the development of a unified conceptual framework and the operationalization of this framework in measures with robust psychometric properties (Briell et al., 2011; Greene et al., 2008; Hofer, 2004b; Schraw & Olafson, 2008). Moreover, while there has been a recent focus in the field regarding the lessons that philosophical epistemology can offer psychological models in terms of further dimensions and finer-grained detail (Chinn, Buckland, & Samarapungavan, 2011; Greene et al., 2008; Murphy, 2012), such approaches centre on theoretical conceptions, or normative claims, regarding the adequate definition and justification of knowledge (Holma, 2015). In contrast, there has been a lack of empirical analyses of knowledge in the form of exploratory studies that consider how the layperson conceives of and understands their use, acquisition and justification of knowledge. Such an approach is necessary too, given findings that suggest there are low correlations between one's explicit beliefs about knowledge (i.e., what individuals believe or theorise that knowledge is, how certain it is and how it is justified) and their practical epistemology (i.e., how they enact and understand their own knowledge production; Chinn & Rinehart, 2016).

Qualitative, interview-based approaches are therefore vital in exploring 'knowing' deeply and adding the detail missing in current conceptions and measures (Greene et al., 2008; Greene & Yu, 2014), while also overcoming the limitations associated with developing questionnaires based on a priori theories of epistemic cognition and then setting out to empirically verify these (Greene & Yu, 2014; Tafreshi & Racine, 2015). Minimal research has also been directed towards the structure and form of epistemic cognition in adults, particularly those not presently in education or those who have not completed post-secondary education (Greene et al., 2008; Greene, Muis, & Pieschl, 2010; Greene & Yu, 2014; Hofer, 2006; 2016; Hofer & Pintrich, 1997; Limón, 2006; Kuhn, 1991). The purpose of this research is therefore to understand the meaning ascribed to knowing and knowledge by adults, in order to build on current understandings and ultimately aid the development of a more comprehensive model of ways of knowing.

Method

Design

The data presented here is from the first author's current doctoral studies and forms part of a larger data set from the preliminary, qualitative phase of an exploratory sequential mixed methods study (Mertens, 2015). As noted above, there appears no present research dedicated to exploring and understanding adults' experiences of their ways of knowing. As such, interpretative phenomenological analysis (IPA) was used in this initial phase to explore the research question: *What is the lived experience of knowing*? In other words, in the

context of their lived experience, what does it mean for an adult 'to know' something and how do they know that they know it?

Briefly, IPA is a psychological, interpretative and idiographic research method (Smith & Eatough, 2012). At its core, there is a concern with "the detailed examination of individual lived experience and how individuals make sense of that experience" (Eatough & Smith, 2008, p. 179). Moreover, the researcher plays an active role in the process of meaning making in IPA; essentially, analysis involves a double hermeneutic in which the researcher attempts to make sense of the participant making sense of their experiences of the phenomenon under investigation (Smith & Osborn, 2008). Finally, IPA was chosen as it enables fine-grained and contextual analyses of the phenomenon under investigation (Eatough & Smith, 2006).

In line with IPAs initial idiographic focus, the data from the first participant of this larger study was analysed and reported here as a case study.

Participants

All names have been changed to protect confidentiality. At the time of the study, Angela was a woman in her 50s who lives in a large Australian city and runs a business.

Data collection

Individuals who had previously taken part in "Ways of Thinking" research and volunteered their email address to be contacted in regards to future research were emailed and invited to participate in the current research. Inclusion criteria were that participants were adults and both willing and able to discuss their experiences of knowing. Following an initial indication of interest, individuals were sent an explanatory statement and, after any additional questions were answered, they were asked to nominate a convenient day and time for a phone interview. The study had ethical approval.

Data were collected using semi-structured phone interviews by the first author. An interview schedule was developed, with questions focused on exploring the participant's experiences of knowing in relation to everyday topics such as work, relationships, health, environmental concerns and personal tastes. The full list of questions can be obtained by contacting the first author.

Angela's interview lasted approximately 1.5 hours and was recorded with a digital recorder. Following the interview, the interview data were transcribed verbatim by the first author. At this time, names were replaced with pseudonyms and any identifiable details removed. Data were managed using MAXQDA Version 12 (VERBI Software). The primary researcher undertook the following process in relation to the data analysis.

Analysis

Although IPA is not a prescriptive approach, the analysis was guided by Smith, Flowers and Larkin's (2009) detailed heuristic framework. The iterative and inductive analytic cycle proceeded as outlined in Table 1.

Table 1.

Steps of interpretative phenomenological analysis process

Step	Description
1	**Immersion in the data set**. This involved listening to the audio recording as well as repeated reading of the transcript.
2	**Initial noting.** Comments on semantic content, language use and abstract concepts were recorded in the margin of the right-hand transcript; these comments could be summaries, associations/connections, preliminary interpretations or record any other point of interest. This process was repeated over several readings of the data, with the researcher becoming more responsive with each reading.
3	**Identification and labelling of themes**. The focus of this stage was to transform the initial notes and ideas into emergent themes, which are concise, specific phrases, or meaningful statements. These themes aimed to capture the essential quality of the text and were grounded in the particular of the participant's words, while also reflecting a broader level of meaning or higher level of abstraction. This stage also progressed in an iterative process, with the 'labels' given to these segments of text often changing during repeated readings of the transcript.
4	**Searching for connections between emergent themes and clustering them**. This was another iterative process of structuring, restructuring and reordering the themes. The text was returned to during this time as part of the process to check the analysis.
5	**Producing a table of themes in a coherent order**. Quotations or definitions are included to illustrate the themes.

Adapted from Smith, Flowers and Larkin (2009).

Results

Context

In the interview, Angela talks about the various things she has to know in her life. These include the administration, marketing, financial and technical side to her work as well as the "one-on-one side" of knowing how to work with her potential customers and knowing the level of their understanding in order to talk to them about her products. She also has to understand their personalities and adapt how she deals with them based on this understanding.

In her daily life, she has to know how to solve problems and is interested in community work. She feels strongly about social justice issues and refers to a strong set of moral and ethical standards which guide what she does and who she does it with. Angela likes her current job and sees herself as "a good people person".

Overview

Analysis of the interview data identified five superordinate themes that encapsulate Angela's experiences of knowing and the meaning she made of these experiences. These superordinate themes and a brief description are included in Table 2. After briefly discussing the first four superordinate themes, the remainder of this article will focus on the superordinate theme of 'coming to know'.

Table 2

Five superordinate themes with descriptions

Superordinate theme	Meaning
Motives to know	The motivations that prompt a need to know or a need to search out and implement knowledge about something.
Influences on knowing	The factors that facilitate or hinder the production, sourcing or implementation of knowledge.
Outcomes of knowing	The impact or meaning of having knowledge.
Knowing that you know	The reasons or justifications given for knowing that something is known.
Process of coming to know	The means or processes of gaining, producing, evaluating or representing knowledge.

These themes reveal that Angela is motivated to know by the need to notice and keep up with changing paradigms in how her work is done as well as a similar need to be prepared to deal with change and uncertainty. She also talks about needing to prove herself, and what she knows, to be a valuable source of knowledge to her customers. This need prompts her to seek out knowledge and to know it well in order to be able to prove herself as a woman and get her customers to trust her enough to ask her questions and want to work with her.

Angela also eluded to the many factors that hinder or facilitate the process of knowing and coming to know, for both herself and others. These include the personal standards that act as a frame and influence how she seeks out, evaluates and uses knowledge. Having enough time and having "the language" are also seen as influences that facilitate knowledge, while emotions (e.g., fear and anger), the complexity of knowledge, challenges to accessing it, and the ignorance or resistance of others all act as barriers in coming to know.

Various outcomes of knowledge were also identified, including the feelings associated with knowing or not knowing, the power of knowledge, and the way that Angela defines herself through not only what she knows and how she uses knowledge, but what others know about her. It seems that knowledge gives Angela confidence when working with others, and she comes across as someone who is at the forefront of knowledge, both in work and in her everyday life.

The analysis also identified the many ways that Angela "knows what she knows", which relates to the reasons or justifications she provides when she states that she knows something. These include more personal forms of justification, which might be referred to as intuition, in which she "just knows", just wakes up and knows that she knows something, or says that she knows because she "can feel it". She also justifies knowing based on whether it coheres with her own personal criteria or because she knows she has "done the work" in gathering the knowledge and that she has "the evidence".

Process of coming to know

Regarding her experiences of knowing, Angela also discussed a variety of ways relating to how she comes to know what she knows. These focus on the processes she uses of gaining, producing or evaluating knowledge. While at times and for certain topics this process involves other people, and getting knowledge from someone deemed a credible source or expert, it also involves doing research and evaluating knowledge claims and sources against her own personal criteria. These processes tend to differ by context, as will be subsequently illustrated.

Research and studying. For a start, Angela often refers to a need to "do research" or studying in her work. While this can involve studying to get to know the business and the products, it often involves coming to know about people, particularly potential customers. This process helps her to know who they are, their needs and whether she is able to work with them or not. She describes research for this as involving looking at online and in-print magazines, doing "the reading" and "picking the brains" of her contacts.

She also describes doing research as a process that can involve a long time, in order to convince herself of her findings, and involving finding out as much as she can about someone in order to weigh up the information about that person. Angela also talks about the ways she evaluates the products of her research, by seeing whether or not it meets her personal criteria. For instance, with the information she is gaining, she notes that she is evaluating various aspects of the person, such as their actions, what they say, and how they present themselves.

Once she has done her research, she describes sitting down and going through a process of weighing up the good and the bad:

> *[you sit] down with a piece of paper and you draw a line down the middle of it and you put the good things on the one side the bad things on the other side and you go I'm gonna have to make a decision about this person and it'll, if the things on the good side outweigh those on the bad side then you know you've got your answer.*

This personal process of doing and evaluating research in coming to know something for work differs from the process she refers to of coming to know whether climate change is real, or not. Here, she instead makes reference to research that is done by others, such as the experiments undertaken by various departments in universities and experiential learning in schools, as well as looking at the work done by surveyors and researchers and looking at

patterns of change as evidence that change was happening. She also talks about how she would do some research from the library to obtain and then present data to convince others of the reality of climate change.

Going to credible experts as sources. Angela also appears to rely a great deal on gaining knowledge from other people who she sees as trustworthy or credible. She tends to rely on having conversations and discussions with them to "pick their brains" and gain the knowledge she needs, such as when she needs to know technical or marketing knowledge for work. She also relies on their endorsements and being able to ask them "the hard questions" when wanting to know about somebody. Often in her work, she relies on these skilled people as valued sources of knowledge or as people she can turn to when she does not know something. It seems that having these skilled, qualified people to rely on gives Angela the confidence to implement the knowledge she gains from them.

Other sources. Apart from people, Angela describes other sources of knowledge that she accesses for various reasons. For instance, in her work, she relies on printed materials as a source of knowledge, which are seen as having a "wealth of information". Importantly, she turns to these sources because they are deemed to be reliable or credible. Moreover, she states that it's the actual existence of these sources that serves as a testament to their quality: "if they've survived, I know they're good".

However, this also seems to be underpinned by her experience with these journal and articles, and more specifically, that she knows the people who have written them and their credibility. This credibility stems from the competence that "becomes clear very quickly" through how they ask questions and deal with responses. Angela clearly knows what it is that she wants to know and this seems to help her in evaluating these sources; that is, she almost ascribes credibility to the source by virtue of the fact that it is telling her what she wants or needs to know. Moreover, if she judges that she is not going to get out of it what she wants to know, she states she will "just dismiss them" and not go on any further with the source. Finally, she also seems to be evaluating the language in these when deciding if these materials are good, and this is a process that she states she can do quite quickly:

> *it doesn't take very long to go through 150 different types and just tick them off, you know, you just go nah, yes, no, no, no, no, no, no, yes and once again it comes back to the language, it comes back to the standards of journalism and you can pick it pretty quickly, you can get through a lot, and that's good, that's really good*

In contrast, to access knowledge for science-related topics, Angela tends to rely on going to official organisations to source knowledge, such as libraries or university courses, or by reading reports from large companies and information in prescribed textbooks.

Representations of the process. Apart from these processes, Angela also has various representations of knowing which she draws on to exemplify the meaning of the process to

her. These representations often focus on the "brain" and the making of various connections, which often seem to be happening subconsciously or while she is asleep. For a start, she describes the process of building knowledge as making connections between what she already knows and new knowledge, and this tends to be prompted by a phrase that someone says:

> *Sometimes someone will say something and that'll ping something in my brain and then the connections start to get made.*
>
> *It's the connections are already started it's like it's building itself inside my head and, you know, and as I move through my work, I might see myself moving in a direction that otherwise I might not have and I'll go "well I wonder why I was doing that?" and then I'll go ", that's right, [NAME] said that at a party last week", this is the result, of sleeping on it if you like, that's the way it feels to me.*

Angela also perceives the knowledge development process as one that is largely subconscious and involves her brain organising various, disparate bits of information in ways that make it accessible and usable, when she is ready for it.

> *I just knew my brain had done that thin work, had taken all the disparate pieces of information that were floating around the synapses and it had just put it into a beautiful spreadsheet for me where information was there when I needed it in the argument, because I'd done the work.*
>
> *My brain managed to catalogue everything for me so that I'm not searching for answers or searching for figures or searching for arguments, they're all just there.*

It may be that her use of these representations, beyond telling us how she perceives the process, is also indicative of the way that Angela makes sense of her experiences of knowing. Moreover, her use of these examples, metaphors or representations may also be her way of conveying such knowledge to others and helping them to understand her experiences of knowing.

Discussion

The aim of the current research was to better understand the individual knower's experiences and meanings of knowing, using a qualitative approach. This IPA case study reported on five themes identified in the experiences of knowing of Angela. In particular, it identified how she knows and comes to know, as well as her motives to know, the impacts of knowing and the influences on knowing. Examination of her experiences also revealed that knowing also depended on context or topic, as is commonly accepted in the literature nowadays (Murphy & Alexander, 2016).

Some of these themes are consistent with components of current models in the literature. For instance, one of the areas often discussed with regards to knowing is that of justification (Chinn et al., 2011; Greene et al., 2008). However, while Angela reports justifying her knowing with some of the ways previously identified in the literature, such as by personal justification (Greene et al., 2008) or justifying a claim based on evidence (Hofer & Pintrich, 1997), the role of intuition and "just knowing" has rarely been discussed or investigated.

Similarly, there has been a great deal of investigation and discussion in the field regarding the various sources of knowledge that individuals use. These have included viewing knowledge on a continuum from originating from an external authority or constructed by the knower in interaction with others (Hofer & Bendixen, 2012). Angela refers to a broad range of sources, which tend to differ depending on the topic, thus providing rich detail regarding her use of various skilled experts and written materials in the co-construction of knowledge. Furthermore, and consistent with the expanded model put forward by Chinn and colleagues (2011), these sources interact in that Angela does not tend to only rely on one type of source or claim from a source at a time, but seems to be gathering as many claims from her trusted sources as possible, before evaluating these and acting on them. Furthermore, and expanding on previous models, she often articulates her grounds for trusting these sources, providing further detail in understanding how one approaches and uses knowledge (Chinn et al., 2011).

Using an interview has also allowed us to explore in depth *how* Angela comes to know and how this process also varies by context. Angela describes a variety of ways of coming to know, ranging from getting knowledge from someone deemed a credible source or expert to doing her own research and evaluating knowledge claims and sources against her own personal criteria. This superordinate theme bears resemblance to the reliable processes described in Chinn, Rinehart and Buckland's (2014) 'AIR model' (Aims and value, Ideals and Reliable Processes) of epistemic cognition, which relates to "the processes by which knowledge and other epistemic products are reliably produced" (p. 426). However, the relationship or overlap between 'coming to know' and learning arguably needs to be clearly articulated and investigated further.

It is also clear that the reasons for knowing, outcomes of knowing and the influences on knowing are also important to consider in any model of knowing or epistemic cognition. These have not been identified in previous models and therefore require further investigation. Moreover, while it is likely that these may not play a central role in the process of knowing and coming to know, they are likely to be variables that need to be considered when looking at the relationships between knowing and various outcomes.

This research has also focused on how the individual reports how they know and go about knowing, and not just their reported beliefs about knowing as many previous models have focussed on (e.g., Hofer & Pintrich, 1997). However, as with any self-report, there is the possibility that the desire to portray herself in a favourable light may have influenced the interview process and how Angela talked about her knowing. However, the use of a phone interview, which made the process more anonymous, may have helped to overcome this. Likewise, the understandings and assumptions of the interviewer may also have subtly impacted on the interview through unconscious decisions to pick up on, and follow up or probe, certain comments or responses made by Angela over others. Regular reflection by the first author on the data collection and analysis process and decisions being made, as well as reflective writing and peer debriefing throughout the process, was utilised to overcome this.

Additionally, what requires further investigation is whether the interview tapped her actual ways of knowing (i.e., as an accurate reflection of how she knows and comes to know) or her tacit beliefs about knowing. Observation or think aloud studies may help to differentiate between the two. Similarly, further consideration is needed to determine how Angela's 'representations of knowing' impact upon how she enacts knowing, if at all, or alternatively, whether this is more about how Angela aims to get others to understand knowledge. Such representations may more accurately be considered as her explicit beliefs about knowing, and as above, will require further investigation with other methods. In addition, it seems throughout the interview that Angela's identity is tied to her knowing and likewise, that her identity and values appear to shape her knowing. Further exploration is therefore warranted to elucidate the interrelationships of these and what may be a dynamic process of the impact of identity on knowing.

Regarding future research, similar interviews have also been undertaken with other participants. These will be analysed individually, before a planned cross-case analysis to identify any common patterns or themes of knowing across the participants. The overall aim is to identify the experiences and meanings central to knowing, while also allowing an understanding of the idiosyncrasies in how knowing is experienced. Further planned research will also investigate whether a resultant model of knowing can be measured quantitatively.

In conclusion, by using a qualitative interview approach we have been able to go beyond what people think knowledge is, where it originates and how it is justified, and have been able to explore the experiences and meanings of knowledge and knowing for the individual knower. Additionally, while some of the areas identified are congruent with current conceptions in the extant literature, the use of an interview has added to these understandings in the form of further, fine-grained detail and an examination of how knowing and approaches change by topic. The outcomes of knowing, motives to know and influences on knowing are also interrelated with the process of coming to know and justifying knowledge, and therefore require further investigation.

Compliance with Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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The role of personality in youth mentoring outcomes

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Research shows that mentoring interventions for young people can be effective as a mechanism to reduce risk and promote positive outcomes. Whilst there is some evidence to show that individual differences in proteges (such as age, ethnicity, gender and socioeconomic status) can influence mentoring outcomes, there is little direct evidence examining the role that mentee personality plays in outcomes. Accordingly, this study examines the relationship between mentee personality and outcomes in negative domains of functioning as measured by the Strengths & Difficulties Questionnaire (SDQ). The SDQ was administered at the start and the end of a 20 week mentoring intervention in high schools across Victoria and New South Wales. The sample consisted of 285 mentees (42% female) ranging in age from 12 to 16 (M = 14). Significant decreases in Total Difficulties were found across T1 and T2. Neuroticism had a significant negative association with decreases in difficulties. None of the other personality factors were associated with mentoring outcomes. These findings suggest whilst mentoring is an effective intervention, young people who are high on Neuroticism may be less likely to experience positive benefits. Implications of the findings for research and mentoring interventions are discussed.

"Every kid needs at least one adult who is irrationally crazy about him or her"
-Bronfenbrenner, 1991

The presence of a caring adult, not necessarily a parent, is one of the single biggest predictors of positive mental health outcomes for young people (Spencer, 2001). In the past, communities have provided natural mentors for young people through a number of roles that adults play – such as extended family members, neighbours, church leaders, sport coaches etc. Changing family and marital and employment patterns, over-crowded schools, and less cohesive communities have been identified as dramatically reducing young peoples' access to caring adults (Eccles & Gootman, 2002). Youth mentoring programs may be able to redress the decreased availability of adult support and guidance in the lives of youth and the lack of supportive non-parent adults in their communities (DuBois & Karcher, 2005; Grossman & Tierney, 1998; Rhodes, 2002).

The presence of an older, more experienced person who can provide support and guidance is important at all stages of development. However, adolescence has its own unique challenges and is often a particularly difficult time for many young people as they face many challenges socially, emotionally and academically. Alongside these challenges comes major biological change. This can cause a great deal of stress for young people as they attempt to find their new place in the world. In Australia, research shows that more

than 25% of young people aged between 16 and 24 experiences a mental disorder (Slade, Johnston, Oakley Brown, Andrews et al, 2009). High levels of emotional and behavioural problems are associated with suicide ideation and behavior, low self-esteem, higher difficulties at school and increased risk behavior in young people (Sawyer, Avney, Baghurst, Clark, Graetz et al, 2000). Government policy has acknowledged these challenges for youth and created initiatives such as KidsMatter (an early intervention program designed for implementation in preschools, long day care and primary schools) and Headspace (information, support and advice for young people 12-25 years old). However, evidence shows that many young people (over 60%) are not comfortable seeking information, advice or support from professional services (Ivancic, Perrens, Fildes, Perry and Christensen, 2014). Barriers to seeking services include that young people prefer to manage the problem themselves, or don't believe that anyone is able to help them. Many don't know where to get help from, or feel that there is stigma associated to seeking support (Ivancic et al, 2014; Sawyer et al, 2000). Despite these barriers, one of the places where young people frequently utilize services is in the school environment (Sawyer et al, 2000). Thus, it important that there are adequate school-based services for adolescents with emotional and behavioural problems, as many are unlikely to seek support outside of this environment. In addition, according to the Youth Mental Health Report (Ivancic et al, 2014), school counsellors report that a growing group of young people are not unwell enough to access external mental health services such as Headspace, but still require help and assistance in order to help themselves build resilience and decrease the risk of developing mental health problems in the future. Recommendations from the Youth Mental Health Report include targeting mental health in schools through early intervention programs that focus on resilience. In-school mentoring programs have the potential to provide support to youth - both those who are currently experiencing, and those at risk of experiencing emotional and behavioural problems.

Whilst a large proportion of the research to date on mentoring (both in the USA and other countries) has been on community based mentoring programs, school based mentoring is one of the fastest growing program models in the USA, with 28% of programs using a school based format (Zappie-Ferradino, in Wheeler, Keller & DuBois, 2010). Overall, research suggests that school based mentoring programs yield small, significant improvements in both academic performance and student beliefs in their own academic ability. For example, Herrara, Grossman, Kauh and McMaken (2011) examined the impact of school based mentoring (SBM) both on outcomes that are closely linked to the school environment (e.g. academic performance, self-perception of academic abilities and attitudes to school) as well as the broader outcomes associated with community mentoring research (e.g. social and personal wellbeing, relationships with others and self esteem). They found that outcomes linked to the school environment were better for mentored youth, specifically academic performance and self-perception of academic abilities. They were also more likely to report having a "special adult" in their lives. However, there were no improvements on broader outcomes such as global self-worth, relationship with others

and rates of problem behaviour. Conversely, when Wheeler, Keller and DuBois (2010) compared three separate large-scale controlled-random assignment studies on school based mentoring (including the study by Herrara et al discussed above), they did not find any effects for academic achievement. They did, however, find modest effects for support from non-familial adults, peer support, self-perception of academic ability, absenteeism and truancy.

On closer examination of the research, it becomes clear that not all young people experience mentoring the same way, or receive the same benefits. In 2011, Dubois, Portillo, Rhodes, Silverthorn and Valentine undertook a meta-analysis which included 73 evaluations of mentoring programs published in the decade between 1999 and 2010. DuBois et al used a developmental model of youth mentoring (Rhodes, 2002) as the conceptual framework, which provided additional insight, particularly in relation to possible moderating factors. In summary, they found that programs are more effective with youth who exhibit problem behaviours; with youth who fit a risk profile of either high environmental/low individual risk or high individual/low environmental risk; when programs have a higher proportion of males; when there is a good fit between the background and educational level of the mentor and the goals of the program; when they match mentors and protégés based on similar interests; and when programs are structured to provide ongoing support for mentors. However, despite it being clear that individual differences play a role in influencing mentoring outcomes, there has been very little research to date that has examined the role of personality and mentoring outcomes for young people.

Personality

Personality traits inform who we are, how we behave and how we think and feel – as well as how other people view us and how we view ourselves. Personality can be defined as dispositions, or traits, that contribute to how people think, feel and behave (Kenrick & Funder, 1998), and is thought to be relatively stable across nearly all dimensions of personality from childhood through to late adulthood (Roberts & DelVecchio, 2000) although some research suggests that stability increases into adulthood (Costa & McCrae, 1997) and that developmental changes during adolescence may result in temporarily less mature personality profiles (de Haan et al, 2013). Whilst there are several taxonomies of personality, The Big Five is a five factor model derived from a lexical approach that has gained increasing prominence in the field of personality research. The Big Five describes five broad dimensions of personality that are thought to represent the major domains of personality: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (McCrae & Costa, 1997).

Personality and Mentoring

Given the idiosyncratic nature of mentoring, it seems likely that mentee personality traits may influence the outcomes that they derive from mentoring. For example, characteristics of neuroticism are suspicion, irritability and hostility. Children high on neuroticism often have difficulties with social relationships (Eisenberg et al, 2000) and neuroticism is an important predictor of relationship dissatisfaction and conflict in

adulthood (Karney & Bradbury, 1995). Mentees who are high on neuroticism may be hesitant to involve themselves with their mentor, because of these tendencies Bozionelos, Bozionelos, Polychroniou & Kostopoulos, 2014). They may also be more likely to expect others to reject them – and so tend to avoid rejection by distancing themselves from others (Brookings, Zembar & Hochstetler, 2003).

Extraversion encompasses sociability, gregariousness and optimism. Children who are high on extraversion have been shown to be more socially competent (Asendorpf & van Aken, 2004). Extraverted mentees would be more likely to interact more with their mentor, and may therefore receive more 'active' mentoring (Bozionelos et al, 2014)

Opennness involves imagination and creativity and openness to new experiences. Some studies have shown this trait to be less reliable than other Big Five traits (Shiner, 1998), however it has been measured reliably in children as young as 3 (Halverson et al, 2003). Mentees who are high on openness may approach the mentoring relationship with an interested and curious mindset, and be more open to listening to their mentor's ideas and advice (Bozionelos et al, 2014).

Agreeableness involves cooperation, generosity, kindness and sensitivity to the needs of others (Roberts, Shiner & Caspi, 2006). Mentees who are high on agreeableness may be more likely to trust their mentor more easily, and are generally likeable and affable, as well as socially competent (Asendorpf & van Aken, 2004.

Finally, Conscientiousness encompasses reliability, a sense of duty and perseverance. Conscientiousness is the most important personality predictor of educational achievement (Judge et al, 1999). Mentees who are high on this trait are likely to take the mentoring relationship seriously – and show up every week, on time. They may also be more likely to pay attention to mentors advice and be able to set and achieve goals within the mentoring intervention. (Bozionelos et al, 2014).

Personality and Adolescent Adjustment

Several studies have looked at adolescent adjustment in relation to these personality traits. These studies have found that neuroticism is correlated with negative adjustment, for example Mulder (2011) found that higher scores on neuroticism were associated with poorer outcomes in the treatment of depression in young people. Other studies found that high neuroticism is positively associated with high levels of depression (Klimstra, Luyckz, Hale, Fermani & Meeus, 2011), anxiety (Griffith et al, 2010; Zinbarg et al, 2010) and misconduct (Barbaranelli et al 2003; Muris et al, 2005). Low agreeableness and conscientiousness have been linked with externalising problems, whereas low extraversion and high neuroticism have been linked to internalising problems. In addition, low Conscientiousness is one of the strongest predictors of delinquency (Roberts et al, 2004) as well as risk taking behaviour (Bogg & Roberts, 2004).

In contrast, extraversion has a negative correlation with depression (Klimstra et al, 2010) and anxiety (Uliaszek et al, 2010). Extraversion, conscientiousness and openness to

experience all have positive associations with wellbeing and self-esteem (Robins et al, 2001).

In light of this evidence, in the current study it was expected that extraversion, openness, agreeableness and conscientiousness would be positively associated with decreases in negative functioning after a mentoring intervention, and that neuroticism would be negatively associated.

Method

Participants

Two hundred and ninety-three young people participated in this study. The population from which the study sample was drawn consisted of all participants in Raise Foundation's in-school mentoring program in 2015. From a potential 493 student participants in the mentoring program, 293 participants completed surveys at both Time 1 and Time 2 and were able to be matched by their unique code.

The overall sample consisted of primarily Australian born participants (83%), with Aboriginal and Torres Strait Islander background accounting for nearly 10% of the sample. 16.5% of the sample were born in a country outside of Australia and 11.6% of the sample did not have English as a first language. The gender breakdown was 57.5% male and 42.5% female. Most young people lived in or near an urban location. 43% of the sample did not live with both parents. The age range of young people was between 12 and 16, with a median age of 14 years.

Context

This study was conducted on the In School Mentoring Opportunity (Ismo) program run by Raise Foundation, an Australian not-for-profit organisation. The Ismo program is conducted in high schools throughout Victoria and NSW, and runs for 20 weeks over two school terms (Term 2 and Term 3). The program's main focus is on young people in Year 8 and 9 who have been identified as being at risk of disengagement. The program aims to facilitate growth and development of the mentees through the development of a close relationship with a non-familial adult. Children are referred to the program by their school's wellbeing contact, in consultation with Raise Foundation program managers. Staff are guided to select mentees based on their ability to benefit from a close relationship with a fully trained mentor. Participation in the program is voluntary, and students are given opportunity to opt-out after attending the initial introductory session. Mentees are matched with mentors based on their connection at the introductory session, the socio-emotional needs of the mentee and shared interests.

Procedure

After obtaining approval from the Monash University Human Research Ethics Committee (MUHREC), the NSW Education Department and the Victorian Education Department, survey data were collected at two time points – at the commencement of the mentoring program in Term 2 and then six months later in the second to last week of the program at the end of Term 3. Demographic information for students and their mentors was collected at the first time point. Measures of personality and quality of mentoring

relationship were collected at the second time point. Surveys were paper-based, and administered to mentees in their first and second-last mentoring session by program staff.

Measures

Personality Measure. The Big Five Inventory (BFI; John, Donahue & Kentle, 1991) measures the five robust personality traits (Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness) and consists of 44 items which are rated on a 5-point Likert scale (from 1 = completely disagree to 5 = completely agree). Cronbach's alpha for this study were as follows: .78 for Extraversion (8 items; e.g., I see myself as someone who is full of energy), .78 for Agreeableness (9 items e.g., Is helpful and unselfish with others), .80 for Conscientiousness (9 items, e.g. Does things carefully and completely), .79 for Neuroticism (8 items; e.g. is depressed, blue), and .75 for Openness (10 items; e.g. Is curious about many different things).

Negative Domains of Functioning. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a brief behavioural screening questionnaire that is often used to evaluate specific interventions and has been shown to be sensitive to treatment effects. It measures emotional symptoms; conduct problems, hyperactivity/inattention, peer relationship problems and pro-social behaviour (5 items per scale). The negative functioning scales can be summed to create a 'Total Difficulties' scale. Items such as "other people my own age generally like me' are rated on a three-point Likert-type scale: 0-'not true', 1-'somewhat true' and 2-'certainly true'. Australian norms are available online (http://www.sdqinfo.org/AusNorm.html) (Mellor, 2005). (α = .73). Cronbach's alpha the Total Difficulties scale used for the current study is .79.

Results

Descriptive statistics

Mean scores for the Total Difficulties Scale (before and after mentoring) and the BFI are indicated in Table 1 (below).

Table 1.

Means and SD's for Negative Functioning and Personality Factors

	N	*M*	*(SD)*
SDQ Total Difficulties Pre-Program	284	14.50	5.9
SDQ Total Difficulties Post-Program	284	13.65	6.2
BFI Neuroticism	278	2.9	.83
BFI Extraversion	278	3.2	.71
BFI Openness to Experience	278	3.6	.61
BFI Agreeableness	278	3.5	.65
BFI Conscientiousness	278	3.1	.70

Mentee adjustment

Paired sample *t*-tests were conducted to determine whether the difference in total difficulties as reported by the participants was significantly different following the Ismo mentoring program. As predicted, there was a statistically significant decrease in their self-reported difficulties post-program compared to pre-program, $t(286) = 3.29$, $p = .001$ (Cohen's $d = -.14$).

Personality and mentee adjustment

Regression analysis was conducted to determine how much the BFI personality traits help to explain mentee outcomes. The model showed that the BFI personality traits explained 6.9% of the variance $F(5,270) = 3.97$, $p = .002$. The strength of the associations was weak, and only Neuroticism made a significant unique contribution to the model (see Table 2 below).

Table 2

Summary of Multiple Regression Analysis for Variables Predicting Mentee Negative Functioning (N = 270).

Variable	*B*	*SEB*	β
Constant	-2.18	2.93	-.007
Extraversion	-0.43	.413	.009
Openness	.202	.484	.029
Agreeableness	.058	.508	.009
Conscientiousness	-801	.467	-1.26
Neuroticism	1.01*	.417	.18
R^2	.069		
F	3.97		

*p = <.05

Discussion

The aims of the current study were to explore the association of mentee's personality traits with outcomes in negative domains of functioning as measured by the SDQ. The findings showed that whilst mentoring was effective in decreasing scores in negative domains of functioning, mentee personality did not play a large role in influencing these outcomes. Specifically, the findings showed a small but significant negative association between Neuroticism and decreases in difficulties, indicating that young people who are high on Neuroticism may be less likely to experience benefits from mentoring. This is consistent with previous research that has found a negative association with neuroticism and mental health outcomes (Barbaranelli et al 2003; Muris et al, 2005). As young people who display higher levels of neuroticism are vulnerable to mental health problems (Griffith

et al, 2010; Zinbarg et al, 2010) and challenging relationships (Caspi, Roberts & Shiner, 2006), it may be particularly important to ensure that mentors are trained and supported to be able to manage the challenges that they face when developing a relationship with a young person who has high levels of Neuroticism.

Contradicting predictions, there was no significant association between Extraversion, Openness to Experience, Agreeableness or Conscientiousness and self-reported negative functioning. Whilst this is inconsistent with previous research that has examined personality and adolescent adjustment (Klimstra et al, 2001; Uliazek aet al, 2010), mentee personality has not previously been considered in a mentoring context. Mentoring is a highly individualised intervention, with the relationship between the mentor and the mentee at the heart of the intervention (Rhodes, 2005). As such, the results of this study suggest that that mentors are able to build a positive relationship with a young person regardless of their personality.

Another possible explanation is that some personality traits have a non-linear relationship with mentee outcomes. In a study examining the relationship between personality and receipt of mentoring, Bozionelos et al found that only Neuroticism and Conscientiousness had a linear relationship with mentoring receipt, whereas with Agreeableness and Openness had an inverted 'U' shape relationship, with benefits ceasing to exist at high levels of these traits. Further research is required to explore the possibility of a quadratic relationship between these personality traits and mentee outcomes.

Practical Implications

Practical implications of these findings suggest that both Program Managers and mentors may benefit in additional training to bring both an in-depth understanding to some of the particular challenges and barriers to creating a close and trusting relationship with young people who are high in Neuroticism, and with this understanding be given specific tools and strategies to overcome the challenges. Mentors who are matched with a young person who is high in Neuroticism may also need additional ongoing support throughout the match to meet these challenges.

Limitations and Future Directions

Several limitations of this study need to be acknowledged. First, lack of a control group means that while there were differences in self-reported mentee adjustment over the 20 weeks of the mentoring intervention, this could be the result of a number of other factors other than mentoring. Future research should include a control group to be able to claim causality, as well as at least one follow-up time point to assess whether the benefits of mentoring are maintained over time. Second, information on negative functioning of mentees is based on self-report of the SDQ. Self-report is sometimes considered to be less reliable, although it has been shown that behavioural problems can be reliably assessed using self-report (Bartels et al, 2011). Third, the BFI (John, Donahue & Kentle, 1991) was chosen for this study as a reliable personality measure with relatively few items. However,

the BFI measures only higher order factors of personality and more nuanced and accurate information may be found at the facet level.

Conclusion

The results of this study suggest that mentoring is an effective intervention that allows mentors to adapt to individual differences in their mentees and provide the idiosyncratic support necessary for positive outcomes to occur for young people with different personalities. The exception to this was for young people who had high levels of Neuroticism, who did not benefit as much as their peers from the mentoring intervention.

Understanding the role that personality plays in influencing outcomes for young people can inform both program practices and ongoing supervision and training for mentors to help them support the needs of their protégés. Mentors can be made aware of some of the particular challenges and barriers to creating a close and trusting relationship with their protégé, and with this understanding be given specific tools and strategies to overcome them. It is hoped that this process of understanding and acceptance of the protégés unique self by their mentor will lead to their own acceptance and understanding of their particular strengths and weaknesses, thus contributing to positive outcomes.

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Exploring the career motivations of prospective counsellors: Perceptions of the counselling profession, career choice satisfaction, and planned persistence

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Using a person-centred approach, this study examined career motivations of future counsellors among students commencing a Master of Counselling course at a Melbourne metropolitan university (N = 195). Hierarchical cluster analysis identified four distinct profiles based on their motivation ratings on Expertise, Social Contribution, Salary, Status, Bludging, and Family Flexibility. These profiles were titled "moderately engaged with family values", "lower engaged", "altruistic with family values", and "multiply motivated". Clusters differed in their perceptions of the demand and reward structure offered by counselling as a career, their level of satisfaction with, and planned persistence in, the counselling profession. Social contribution was a high motivator, and all clusters rated counselling as being both a highly demanding and rewarding career. There were no significant cluster differences in career choice satisfaction; planned persistence only differed between the "moderately engaged with family values" and the "multiply motivated" clusters. Cluster composition was unrelated to age, gender, or pursuit of a previous career. Thus, different types of people are motivated to become counsellors for different reasons, which educators and course providers could capitalise on to tailor preparation for the counselling profession. In future, more tailored training and induction may enhance effectiveness and reduce burnout, benefiting counsellors and their clients.

With mental illness rates on the rise, knowledge of the types of people choosing to become counsellors is vital. Although parallel Australian statistics are not publicly reported, estimated burden of mental illness in the 1990s in Canada was $14.4 billion (Stephens & Joubert, 2001), and in the United States, $147 billion (Rice & Miller, 1998). Economic costs are compounded by high turnover and burnout in the mental health profession. An American review indicated 21-67% in the field experience burnout (Morse et al., 2012).

To understand what motivates individuals to undertake counselling work, it is important to take a theoretical approach. The expectancy-value model has been successfully used for investigating career decision-making; but no explicit framework has been applied to counselling career choice. A motivational impetus examined in relation to counsellors has been formative childhood experiences. Early caretaking roles may contribute to choosing

therapeutic work, whereby, those with neglected childhood care needs are likely to have learned that caring for others is more important than caring for themselves (DiCaccavo, 2002). “Parentification” describes children who undertake parents’ responsibilities, including contributing to household income, preparing meals, and looking after younger siblings (Kelley et al., 2007). Similarly, high rates of adverse childhood experience associated with aspirations toward helping professions (Nikcevic, Kramolisova-Advani, & Spada, 2007). The “wounded healer” idea suggests that in wrestling personal demons, future therapists foster a strong desire and ability to help others (Farber et al., 2005) by drawing on their own “woundedness” (Zerubavel & Wright, 2012). Such findings can complement theoretically framed studies looking to investigate conscious motivations of future counsellors.

Expectancy-value Theory

Expectancy-value theory (Eccles et al., 1983) argues that individual choice (e.g., for education, occupation), persistence and performance, can be explained by one’s expectancies for success, and level of value/importance placed on perceived options. It provides an empirically tested framework for investigating individual motivation in a number of professions. Four main aspects of achievement values are: attainment (importance placed on doing well on a task), intrinsic (enjoyment gained from doing it), utility (how well a task fits with future plans) and cost (e.g., time, effort, emotional costs) (Wigfield & Eccles, 2000).

These values have been shown to influence planned persistence in STEM-related careers (Andersen & Ward, 2013). Effort and opportunity costs influenced decisions to discontinue STEM college majors (Perez, Cromley, & Kaplan, 2014); Watt et al. (2012) found that success expectancies were key predictors in USA and Canadian samples, but, intrinsic value in Australia, illustrating contributing sociocultural influences.

Teaching career motivations have been researched within the expectancy-value framework, which underpins the FIT-Choice (Factors Influencing Teaching Choice) model (Watt & Richardson, 2007). With minor cultural adaptations, it has acceptable reliability and construct validity across more than 18 language translations, providing a strong framework for understanding motivations across settings (Watt & Richardson, 2012). Again, importance is placed on individual differences, with different combinations of motivations more relevant for some groups than others (Watt & Richardson, 2008). They identified three teacher types: highly engaged persisters, highly engaged switchers, lower engaged desisters. Different motivational profiles forecast different outcomes for their planned effort, persistence, leadership, and professional development. Longitudinal data revealed ability motivations and social utility value led to more positive teaching habits; conversely, fallback career, and social influence motivations had a negative impact. Thus, some motivations proved adaptive and others proved maladaptive (Richardson & Watt, 2014).

The Present Study

This study adopts expectancy-value framework to shed new light on motivations of those wishing to pursue counselling, with potential to improve client outcomes, reduce economic burden, improve teaching and development, and reduce burnout. Given everyone is different, it is important to understand motivation from a person-centred perspective – looking at how combinations of latent factors come together within individuals, and how these can influence career decision-making. A person-centred approach may enable researchers to obtain a more complete picture of what motivates different *types* of people.

The present study focused on six Motivation for Career Choice (MCC) factors (Watt & Richardson, 2006); the MCC is a generalisation of the FIT-Choice scale to measure motivations perceived by individuals as important in their career choice. Factors included tapped altruistic and personal utility values, rewards (financial and social standing), and costs (professional understanding and demanding workloads).

The main aims were to investigate: (1) how selected career motivation factors combined to create motivational profiles among different types of aspiring counsellors, (2) how profiles predicted choice satisfaction and planned persistence in the profession, (3) and, associations between profiles and professional demand/reward perceptions.

It was hypothesised that social contribution would be the most endorsed motivation and at least one cluster would be an altruistic type. With some studies identifying the need for professional autonomy as a reason or reward for engaging in therapeutic work (Farber et al., 2005) it was speculated that family flexibility could be a strong motivation for some.

Method

Participants

This is part of a longitudinal study focusing on how and why people choose careers in counselling and psychology. Participants were graduate enrolments (N = 195) in first semester Master of Counselling courses at a major Melbourne university, including domestic (Australia, n = 73) and international offerings (Singapore & Hong Kong, n = 91). 140 were female (M_{age} = 35.97, SD = 11.1), 28 male (M_{age} = 35.04, SD = 11.88), 27 did not specify gender.

Materials and Procedure

The questionnaire included selected factors from three instruments. Motivation for career choice items were designed to tap 6 factors (MCC; Watt & Richardson, 2006): Expertise, Fallback career, Family time, Salary, Social contribution, and Status. Beginning with the stem, “It is important to me to have a career that…” individuals rated 17 items on a scale from 1 (not at all) to 7 (extremely). Career choice satisfaction items (3 items), planned persistence (4 items), and demand/reward perceptions of the counselling career (5 items),

were adapted from the Professional Engagement and Career Development Aspirations scale (PECDA; Watt & Richardson, 2008) on 7-point response scales (Table 1). Permission was obtained from the university ethics committee, course leaders, and tutors to distribute 30-minute surveys during class time.

Table 1

Summary of the Different Scales used in the Questionnaire, along with Item Numbers and Stems

Scale	Item	Item stem
	MCC	*"It is important to me to have a career that…"*
Expertise	16	involves high levels of expert knowledge.
	21	involves highly specialised knowledge.
	62	involves high levels of technical knowledge.
Salary	5	is well paid.
	60	earns a good salary.
Social Contribution	10	lets me provide a service to society.
	26	allows me to make a worthwhile social contribution.
	36	allows me to 'give back' to society.
Status	13	is a high status career.
	19	is a well-respected career.
	61	is highly valued by society.
Bludging	8	has lengthy holidays.
	17	requires little effort.
	24	has a short working day.
	39	has a light workload.
Family Flexibility	22	has hours that fit with family responsibilities.
	34	fits vacation time with family commitments.
	Career Choice Satisfaction	
	B4	How carefully have you thought about choosing this career?
	B5	How satisfied are you with your choice of this career?
	B6	How happy are you with your decision to pursue this career?
	PECDA	
Persistence	P4	How certain are you that you will remain in counselling?
	P6	How confident are you that you will stick with counselling?
	P8	How sure are you that you will persist in a counselling career?
	P10	How sure are you that you will stay in the counselling profession?
Reward Perceptions	P15	Do you think counsellors earn a good salary?
	P16	Do you believe being a counsellor is perceived as a high-status occupation?
	P17	Do you think counsellors feel valued by society?
Demand Perceptions	P18	Do you think counsellors require high levels of expert knowledge?
	P19	Do you think being a counsellor is hard work?

Analyses

Missing data were excluded listwise. Maximum likelihood exploratory factor analysis (varimax rotation) assessed the underlying structure of the motivation items, revealing that not all items matched up to their supposed initial factors: items 8 and 24 (initially assigned to family time) ended up in a new factor along with items 17 and 39 (initially assigned to fallback career). This factor was labelled "Bludging", an Australian expression that describes the act of avoiding heavy workloads. Among preservice teachers, Richardson and Watt (2006) had attempted to tap this factor, but found "Bludging" items were "empirically indistinguishable from family time" (p. 54). The remaining items were termed Family flexibility. All other factors appeared as expected (Table 2).

Table 2

Final Rotated Factor Matrix Maximum Likelihood Exploratory Factor Analysis of MCC Items

	Factor					
Item	Bludging	Social Contribution	Expertise	Status	Salary	Family Flexibility
	α = .776	α = .877	α = .801	α = .797	α = .788	α = .674
MCC24	**.765**	.038	.044	.105	.108	.251
MCC39	**.752**	-.015	.057	.167	.142	.041
MCC8	**.651**	.035	.025	-.096	.040	.318
MCC17	**.561**	-.187	-.059	.320	.047	-.051
MCC10	.011	**.893**	.134	.066	.003	.009
MCC36	-.007	**.797**	.160	.112	-.021	.120
MCC26	-.075	**.788**	.224	.074	-.068	.192
MCC16	-.008	.251	**.804**	.087	.053	.065
MCC21	-.047	.142	**.753**	.230	.164	.134
MCC62	.115	.161	**.621**	.261	.033	.007
MCC61	.140	.250	.301	**.694**	.155	.191
MCC19	.121	.165	.310	**.664**	.193	.198
MCC13	.343	-.005	.365	**.511**	.164	-.085
MCC5	.206	-.089	.094	.158	**.956**	.023
MCC60	.139	-.004	.277	.388	**.563**	.266
MCC22	.149	.159	.036	.170	.105	**.711**
MCC34	.455	.161	.168	.058	.023	**.686**

Note. Bold denotes highest factor loadings for each item.

Hierarchical cluster analysis (Ward's method) identified motivational profiles, based on averaged scores for the final six motivational factors. The scree-type plot was ambiguous (Figure 1), therefore, MANOVAs (using Bonferroni correction to $p < .008$ and Tukey post hocs) compared a range of cluster solutions on the motivation factors. The educed 4 clusters were then compared on planned persistence and career choice satisfaction in a subsequent MANOVA. A final MANOVA compared motivational clusters on professional demand/reward perceptions.

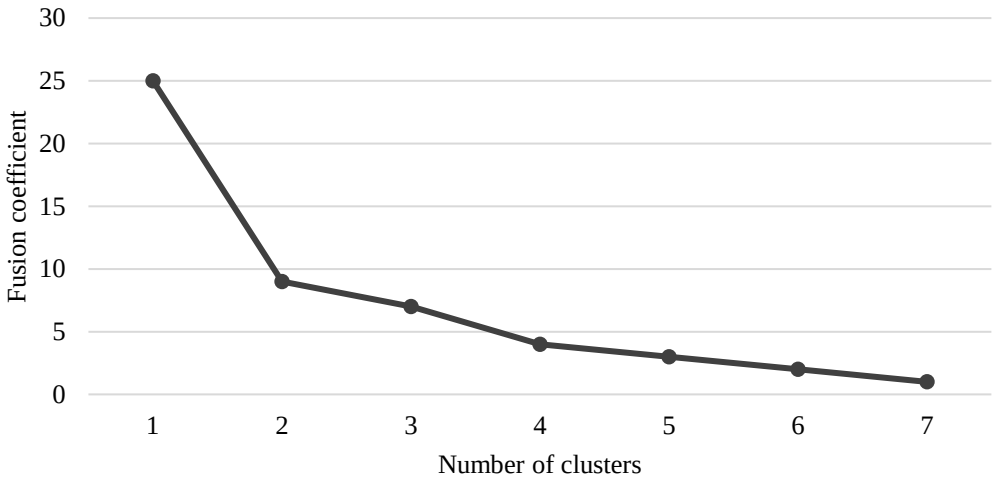

Figure 1. Scree-type plot used to indicate appropriate number of clusters.

Results

Whole Sample Story

Of the motivations, Social contribution was the most highly endorsed (*M*=6.07, *SD*=.90), followed by Expertise (*M*=5.18, *SD*=1.02), Family flexibility (*M*=4.92, *SD*=1.40), Salary (*M*=4.91, *SD*=1.17), and Status (*M*=4.59, *SD*=1.12). "Bludging" was lowest rated (*M*=3.09, *SD*=1.05) (Figure 2). On criterion variables, participants scored highest on Demand perceptions (*M*=5.95, *SD*=.80) followed by Satisfaction (*M*=5.85, *SD*=.86) and Persistence (*M*=5.61, *SD*=.89); Reward perceptions were rated lowest (*M*=4.50, *SD*=1.07) (Figure 3). Intercorrelations are presented in Table 3.

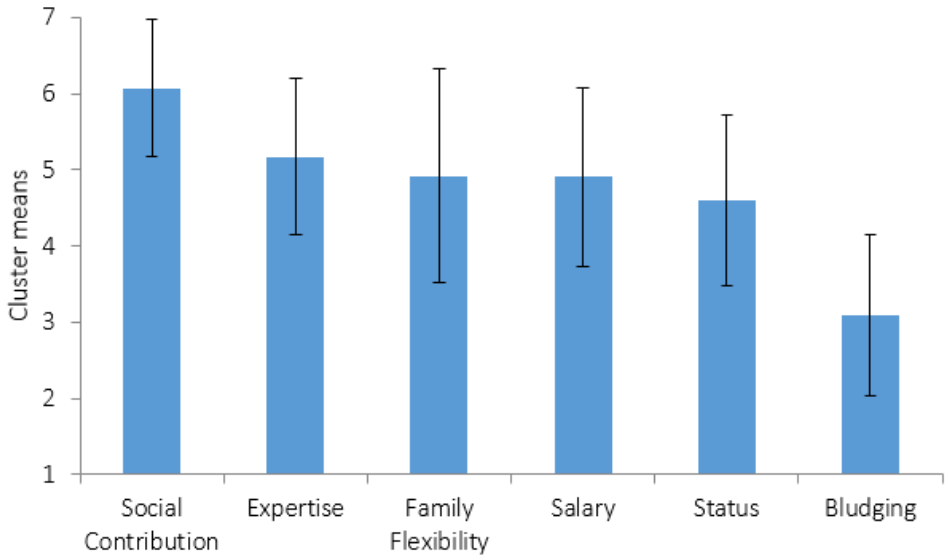

Figure 2. Summary of participant means and standard deviations on each of the six motivation factors.

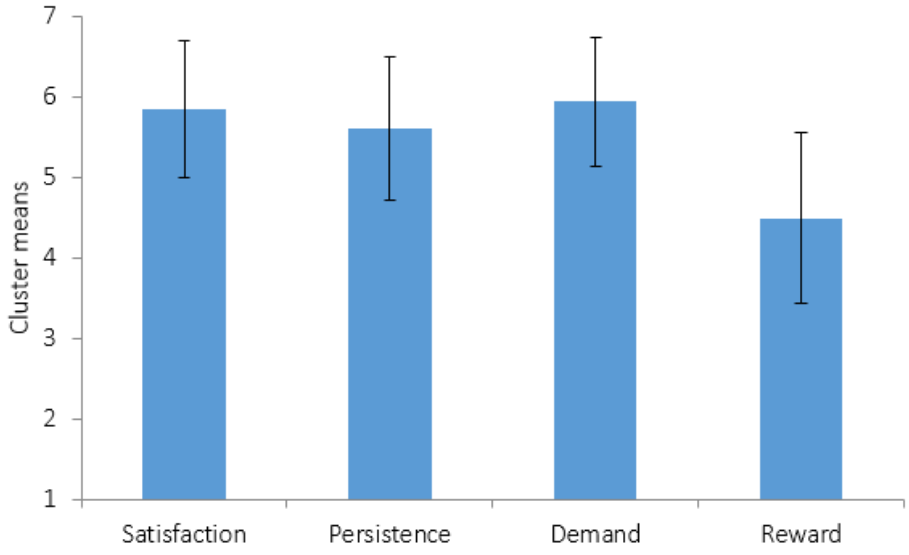

Figure 3. Summary of participant means and standard deviations for perception variables.

Table 3

Pearson Correlation Matrix Examining Relationships Between All Study Variables

	EX	SA	SO	ST	BL	FA	Sat.	Pers.	Dem.	Rew.
EX	1									
SA	.25**	1								
SO	.31**	-.03	1							
ST	.48**	.51**	.23**	1						
BL	.06	.34**	-.01	.34**	1					
FA	.23**	.34**	.30**	.30**	.44**	1				
Sat.	.20*	.05	.17	.04	-.38**	.06	1			
Pers.	.25**	.07	.07	.11	-.29**	-.12	.53**	1		
Dem.	.32**	.19*	.14	.15	-.16	-.04	.16	.30**	1	
Rew.	.33**	.35**	.05	.44**	.21*	.11	.13	.31**	.22*	1

Note: **p < .01; *p < .05; EX – Expertise; SA – Salary; SO – Social Contribution; ST – Status; BL – Bludging; FA – Family Flexibility; Sat. – Choice Satisfaction; Pers. – Planned Persistence; Dem. – Perception of Demands; Rew. – Perception of Rewards.

Hierarchical Cluster Analysis

There was a significant multivariate effect of cluster on the 6 motivation factors, $F(18, 471)=23.15$, $p < .001$; Pillai's= 1.41; $\eta_p^2=.47$. Univariate results were all significant using a Bonferroni adjusted alpha of .008: Expertise $F(3, 160)=19.67$, $\eta_p^2=.27$; Salary $F(3, 160)=38.93$, $\eta_p^2=.42$; Social contribution $F(3, 160)=10.40$, $\eta_p^2=.16$; Status $F(3, 160)=43.90$, $\eta_p^2=.45$; Bludging $F(3, 160)=22.92$, $\eta_p^2=.30$; Family flexibility $F(3, 160)=97.73$, $\eta_p^2=.65$.

Cluster names were decided with reference to literature regarding teaching motivation clusters (Watt & Richardson, 2008), illustrated in Figure 4 and summarised in Table 4.

Table 4

Summary of Means and (Standard Deviations) of Clusters on the Six Motivation Factors, Satisfaction & Persistence, and Demand & Reward Perceptions

	Cluster 1 "moderately engaged with family values"		Cluster 2 "lower engaged"		Cluster 3 "altruistic with family values"		Cluster 4 "multiply motivated"	
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
MCC Motivation Factors								
Expertise	4.86^{bd}	(0.78)	4.35^{acd}	(1.24)	5.22^{bd}	(1.25)	5.96^{abc}	(0.64)
Salary	5.01^{bcd}	(0.86)	4.40^{acd}	(1.22)	3.15^{abd}	(0.96)	5.82^{abc}	(0.72)
Social Contribution	5.95^{b}	(0.92)	5.42^{acd}	(1.11)	6.50^{b}	(0.58)	6.40^{b}	(0.61)
Status	4.52^{bcd}	(0.73)	3.72^{ad}	(1.26)	3.63^{ad}	(0.95)	5.80^{abc}	(0.59)
Bludging	3.61^{bc}	(0.73)	2.27^{ad}	(0.88)	2.33^{ad}	(0.95)	3.40^{bc}	(1.22)
Family Flexibility	5.54^{b}	(0.77)	2.69^{acd}	(1.02)	5.13^{b}	(0.92)	5.45^{b}	(0.81)
Career Choice Satisfaction	5.67	(0.82)	5.67	(0.98)	6.20	(0.79)	6.13	(0.73)
PECDA								
Planned Persistence	5.27^{d}	(0.78)	5.67	(0.83)	5.84	(1.14)	6.08^{a}	(0.77)
Demand	5.75^{d}	(0.79)	5.88	(0.83)	6.08	(0.83)	6.25^{a}	(0.61)
Reward	4.34^{d}	(0.83)	4.22^{d}	(1.09)	4.18^{d}	(1.20)	5.08^{abc}	(1.14)

Note. Superscripts used to highlight significant differences between factors (as indicated by Tukey post hoc tests, $p < .05$), where a = cluster 1, b = cluster 2, c = cluster 3, and d = cluster 4. Thus the first mean listed of 4.86^{bd} indicates that cluster 1 differs significantly from cluster 2 and 4 on expertise.

- Cluster 1 (n = 70), named "moderately engaged with family values", scored in the mid range for all motivations except Family flexibility, in which they scored highest.

- Cluster 2 (n = 36) labelled “lower engaged”, scored significantly lowest on Expertise, Social contribution and Family flexibility; and lower than clusters 1 and 4 on Salary, Status and Bludging.
- Cluster 3 (n = 20), named “altruistic with family values”, scored lowest on Salary, higher on Social contribution than cluster 2, and lower on Status and Bludging (than cluster 1 and 4).
- Cluster 4 (n = 38), labelled “multiply motivated”, scored highest on Expertise, Salary, and Status. While they scored significantly higher than clusters 2 and 3 on Bludging, they also scored highly on Social contribution and Family flexibility.

Figure 4. Mean cluster scores on MCC scale for “moderately engaged with family values” (Cluster 1), “lower engaged” (Cluster 2), “altruistic with family values” (Cluster 3), “multiply motivated” (Cluster 4).

Note. Superscripts used to indicate that a cluster differs significantly from another cluster on a particular factor (as indicated by Tukey post hoc tests, $p < .05$), where a = cluster 1, b = cluster 2, c = cluster 3, and d = cluster 4. Thus, cluster 1 differs significantly from cluster 2 and 4 on Expertise and so on.

Choice Satisfaction and Planned Persistence

There was a significant multivariate effect of cluster on the combined dependent variables, $F(6, 260)=4.05$, $p=.001$; Pillai’s = .17; $\eta_p^2=.09$. Univariate results were also significant, using a Bonferroni adjusted alpha of .025: Satisfaction $F(3, 130)=3.54$, $p=.016$, $\eta_p^2=.076$; Persistence $F(3, 130)=7.04$, $p< .001$, $\eta_p^2=.14$ (Table 4). Tukey post hoc tests ($p < .05$) revealed no significant paired cluster differences for Satisfaction (Figure 5). For Persistence, clusters 1 and 4 significantly differed, with cluster 4 (“multiply motivated”) scoring highest, and cluster 1 (“moderately motivated with family values”) lowest (Figure 5).

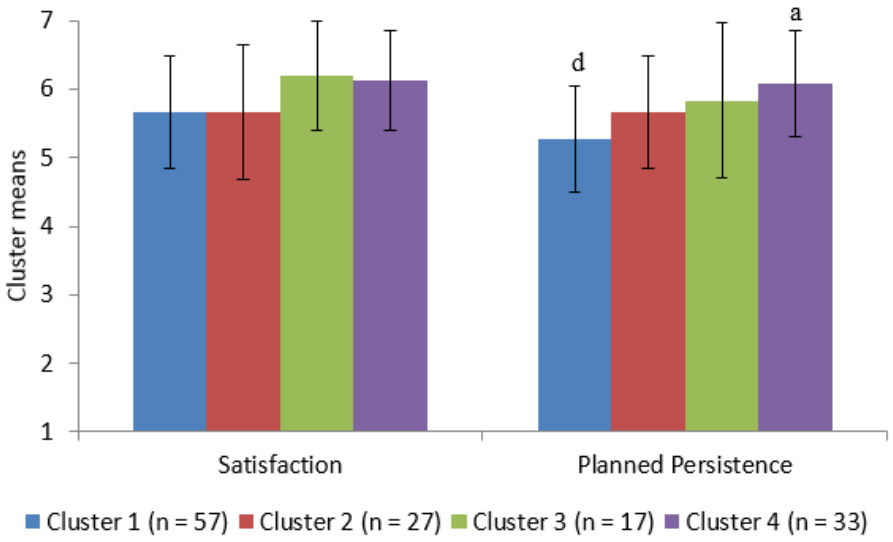

Figure 5. Comparison of mean cluster scores on satisfaction with choice and planned persistence for "moderately engaged with family values" (Cluster 1), "lower engaged" (Cluster 2), "altruistic with family values" (Cluster 3), "multiply motivated" (Cluster 4).
Note: superscripts used to highlight significant differences between factors (as indicated by Tukey post hoc tests, $p < .05$), where a = cluster 1, b = cluster 2, c = cluster 3, and d = cluster 4. Thus, cluster 1 differs significantly from cluster 4 on Planned Persistence, and so on.

Perceived Demands and Rewards

MANOVA also assessed the relationship between cluster and perceived demands/rewards of counselling work. There was a significant multivariate effect of cluster, $F(6, 318)=4.26$, $p < .001$; Pillai's = 1.5; $\eta_p^2=.07$. Univariate results were also significant, with Bonferroni adjusted alpha of .025: demand $F(3, 159)=3.82$, $p=.011$, $\eta_p^2=.07$; reward $F(3, 159)=6.16$, $p = .001$, $\eta_p^2=.10$ (Table 4).

Tukey post hoc tests revealed significant paired differences (Figure 6). Cluster 4 ("multiply motivated") scored higher than Cluster 1 ("moderately engaged with family values"). Additionally, they scored highest on Reward perceptions, resonating with their higher career motivations of Salary and Status (Figure 4) which, however, appeared not to the detriment of their more altruistic motivations such as their desire to make a social contribution.

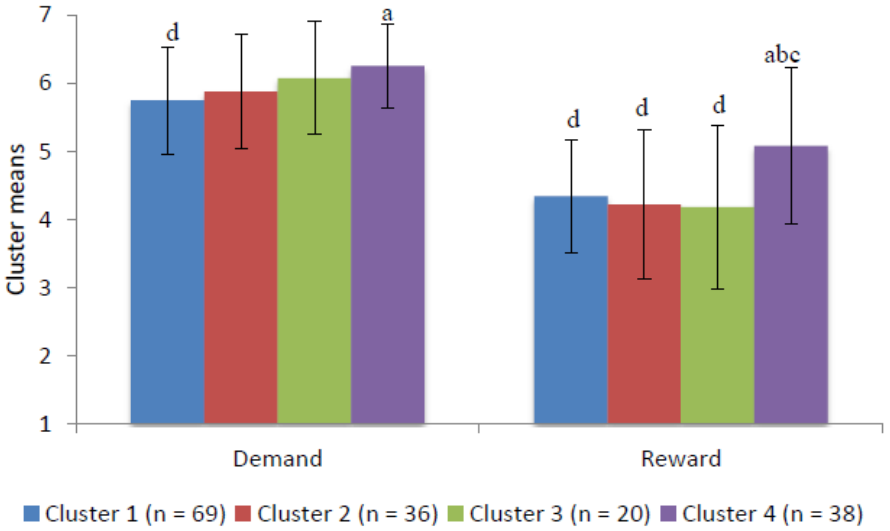

Figure 6. Comparison of mean cluster scores on demand and reward perceptions for "moderately engaged with family values" (Cluster 1), "lower engaged" (Cluster 2), "altruistic with family values" (Cluster 3), "multiply motivated" (Cluster 4).
Note. Superscripts used to highlight significant differences between factors (as indicated by Tukey post hoc tests, $p < .05$), where a = cluster 1, b = cluster 2, c = cluster 3, and d = cluster 4. Thus, cluster 1 differs significantly from cluster 4 on Demand perceptions, and so on.

Cluster Composition

Age, gender, previous career, and study location were examined to further understand cluster characteristics. ANOVA demonstrated no relationship between age and cluster; $F(3, 154)=2.10$, $p=.102$. A Chi-square showed no association between gender and cluster, $\chi^2(3, n=164)=2.49$, $p = .478$. Neither was there any relationship between cluster and previous career or not, $\chi^2(3, n=164)=2.28$, $p = .517$. There was an association between study location and cluster, $\chi^2(3, n=164)=13.83$, $p = .003$, with very few domestic students (5.5%) in cluster 3 ("altruistic with family values"), and a high proportion of international students (49.5%) in cluster 1 ("moderately engaged with family values") (Figure 7).

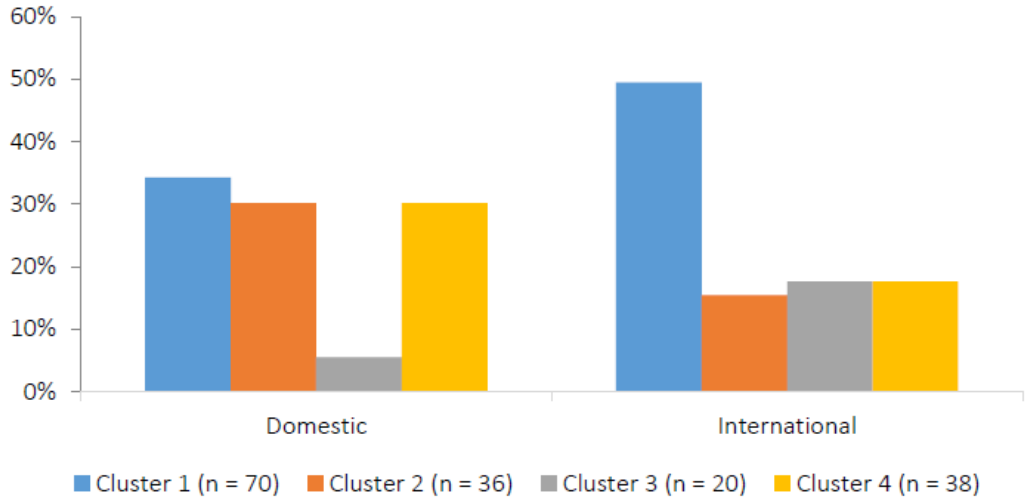

Figure 7. Comparison of cluster differences based on study location for "moderately engaged with family values" (Cluster 1), "lower engaged" (Cluster 2), "altruistic with family values" (Cluster 3), "multiply motivated" (Cluster 4).

Discussion

The study addressed key questions relating to the motivations of future counsellors: (1) how six career motivation factors combined to create differing motivational profiles of aspiring counsellors; (2) how these profiles predicted choice satisfaction and planned persistence in counselling; (3) and the association between motivational profiles and professional demand/reward perceptions. Four distinct profiles exhibited different levels and combinations of motivations, and systematic differences on criterion variables.

Central Findings

Making a positive difference. As hypothesised, Social Contribution was the most endorsed career motivation, and "Bludging" the least. Similarly, past literature recognises the conscious desire to help others as an important consideration for counsellors (Ribak-Rosenthal, 1994). Participants perceived counselling as more demanding than rewarding. Despite this, choice satisfaction and planned persistence were high. Interestingly, demand positively correlated with planned persistence, perhaps indicating that these demands served as motivating challenges to master. Overall, future counsellors were highly motivated to make a difference, while being influenced by family flexibility, economic stability and social standing. They were less inclined to choose the career because it would be easy.

The "altruistic with family values" cluster was highly motivated by social contribution and family flexibility. Salary, status, and bludging did not serve as influential drivers. This cluster echoes the notion within psychotherapy regarding therapists' altruistic tendencies, and reflects altruistic trends in other helping professions, including teaching (Watt &

Richardson, 2007) social work (Stevens et al., 2010) and nursing (Miers, Rickaby, & Pollard, 2007).

Family values. Excluding the "lower engaged" group, all clusters were strongly motivated by family flexibility. Mean ages were 36.0 years for women and 35.0 for men, suggesting a life stage in which flexible hours for balancing family commitments might be preferred. Similarly, a cluster of teachers was identified, who were highly motivated by time for family and the need for a more satisfying career closer to home (Richardson & Watt, 2005). The "moderately engaged with family values" cluster was highly motivated by family flexibility. Yet, they had significantly higher salary and status motivations than the altruistic cluster. The salary motivation in particular, may coincide with family values, in terms of financially supporting other family members.

The "moderately motivated with family values" cluster, contained almost half of all international students (compared with one-third of all domestic students in that cluster), suggesting family values may play a larger role in career choice for international students. With many Asian cultures prioritising family commitments, it makes sense that these Singaporean and Hong Kong students derived their motivation from family values. Other clusters reflected social trends in Australia, which favour a greater sense of individualisation and search for identity, over more traditional familial reasons for career choice. However, most participants held rather strong family values, potentially due to coinciding motivations such as the opportunity to work to one's own schedule and the associated autonomy.

Lower versus higher motivated clusters. "Lower engaged" individuals scored lower on almost all motivations, resembling the "lower engaged desisters" identified among future teachers (Watt & Richardson, 2008), who scored lowest on planned effort, professional development, leadership and planned persistence. "Lower engaged" future counsellors did not differ significantly from others on planned persistence; as such the "desister" tag was not included in their name.

Conversely, "multiply motivated" individuals scored highly on almost all motivations; including "Bludging", although still rated below the scale midpoint. This cluster also perceived the rewards (e.g. money, prestige) of counselling as highest, resonating with their high motivations for salary and status. But this did not detract from their altruistic motivations, which may generate other kinds of rewards (e.g., positive feelings associated with helping others). Although this cluster seemed to have a more positive outlook, their perception of career demands was also higher, perhaps reflecting an acceptance and eagerness to confront new challenges as a source of growth. Counselling students and teachers in an American study, agreed that counsellors were motivated by the idea of being mentally stimulated and challenged (Ribak-Rosenthal, 1994). "Eustress" refers to positive responding, and outcomes to stress (O'Sullivan, 2011). The items that assessed demand pertained to requirements of expertise and hard work, rather than potential results of the work (e.g., stress, emotional exhaustion).

Presence of a "lower engaged" cluster was interesting, given they did not differ significantly on satisfaction, and their planned persistence was reasonably high. Possibly, they saw their dream career as unattainable, and had settled for a more realistic career. Although less strongly motivated towards counselling, perhaps they perceived it as a viable option, suiting their needs and interests in the long term.

Differing professional desire. No significant cluster differences on choice satisfaction were found. "Multiply motivated" individuals planned to persist longer than "moderately engaged with family values" participants, however this was the only significant difference. This was interesting, given the varying levels of motivation per cluster, reinforcing the notion that people can achieve similar satisfaction despite valuing different aspects of the career. All clusters had high satisfaction, suggesting counselling was a career they had sought out. Indeed, a Master of Counselling course, typically requiring a three- or four-year prerequisite undergraduate degree, is not generally something that one "falls into". The diverse career pathways and work settings available in counselling mean that intending counsellors may have different future objectives in mind.

Theoretical & Practical Implications

Findings from motivational profiles are consistent with expectancy-value framework, where participants were motivated by factors they valued, and their demand and reward perceptions. Given no difference was found on the basis of age, gender, or previous career, the variations in motivation likely came as a result of individuals' unique characteristics, rather than broad demographics. An individualised, person-centred approach proved useful in understanding the multifaceted, complex ways people make career decisions, illustrating that characteristics like age or gender do not define who we are. When it comes to enrolment and education, course providers cannot rely on one-size-fits-all, or assume the values and expectations for one group will the same for another.

Making a social contribution was important motivation to future counsellors; bludging was not, suggesting individuals participating in counselling courses are there for positive reasons. With high levels of emotional exhaustion among counsellors (Ducharme, Knudsen, & Roman, 2007), students' high choice satisfaction and planned persistence is important. Starting out with a positive mindset may help prepare them for professional demands. While students likely hear about the demanding nature of counselling, they are unlikely to fully experience it until commencing the job. The lived experience may lead to the development of burnout. Understanding the different cluster types may assist in career support and induction, outlined under four themes following.

Ensuring work-life balance. For "moderately engaged with family values" individuals, family was a priority along with social contribution, and to a lesser extent, salary. For psychologists, there was a relationship between work-family conflict and burnout (Rupert, Stevanovic, & Hunley, 2009). In the related counselling profession, attention should

be paid to workplace settings, ensuring those with high family values are not pushed too hard or early in their roles. Solo-practising psychologists appear to experience less emotional exhaustion and greater sense of personal accomplishment than those in agencies (Rupert & Morgan, 2005). The extra challenges faced in non-private settings, include having less control and spending more time doing administrative duties (Rupert et al., 2009). The most important objective will be to ensure the best fit for those highly motivated by family values, whether by facilitating private practice jobs that allow for more personal agency, or providing extra support in non-private settings.

Inspiring drive and passion. "Lower engaged" participants were less motivated, despite high satisfaction and planned persistence. It is reassuring that they scored lowest on bludging, however the lack of strong motivations to pursue counselling may signal concern. The related Fallback motivation, had negative consequences among teachers (Watt & Richardson, 2008). Removed from this study as a result of changes generated by the exploratory factor analysis, it may be useful to explore among counsellors in future. With psychology courses often having stricter entry requirements than counselling, it could be that some "lower motivated" individuals had not achieved entry into an aimed psychology honours or masters course, and settled for counselling instead. Or, they could have been deterred by the duration of psychology pathways, and elected to pursue a related field, allowing them to start work more quickly. It may also be that this cluster was not overly motivated by any aspect of counselling, but perceived few career alternatives. In any event, it is important to tailor course progression in ways that inspire learning and growth, and provide incentives that breed positive professional perceptions and values.

Maintaining social commitment. The educative focus for "altruistic with family values" individuals should be on maintaining high levels of altruism. This is important considering the emotional toll associated with mental health work. For caregiving professionals (e.g., healthcare workers, social workers, teachers), too much emotional involvement may reduce service quality and increase burnout (Miller, Stiff, & Ellis, 1988). Nurses who held altruism as a core value experienced high levels of emotional exhaustion (Altun, 2002). Altun (2002) suggested nurses must strive for a sound understanding of personal values and beliefs in order to avoid internal conflicts. It will be similarly important for altruistically motivated counsellors to receive training and support to manage their own emotions and ensure that they are helping clients effectively. They may also benefit from similar thought and reflective practice recommended for nurses.

Motivation and selection. "Multiply motivated" participants valued many aspects of counselling. Interestingly, a study of motivations among volunteers providing emotional support and day-to-day assistance to clients with HIV/AIDS, found that multiply motivated individuals experienced negative outcomes, including higher stress and cost, relative to those who volunteered to satisfy a single motivation (Kiviniemi, Snyder, & Omoto, 2002). It is unclear whether the same would be true for counsellors; it may be that having higher

expectations on multiple factors, could lead to greater disappointment if these expectations are not met. Indeed, with this cluster exhibiting higher reward perceptions than any other, it could be of interest for future longitudinal studies to focus on multiply motivated counsellors as they progress their careers.

For multiply motivated individuals, it can be hard to know which motivations to nurture or prioritize. There has been debate regarding selection of prospective teachers based on personal qualities likely to predict teaching effectiveness (Australian Institute for Teaching and School Leadership, 2015). This notion may be premature for teachers and counsellors, where, first, a greater understanding must be reached in terms of which motivations predict actual persistence and satisfaction following work commencement. It is also important not to discourage intending counsellors who might adapt and grow in the profession. Training may help develop or sustain positive motivations. Course providers must be aware of which motivational qualities can, or should, be shaped in training, and therefore more research is required.

Limitations and Future Directions

The sample of 195 was relatively small, due to low response rates in some classes, with a disproportionate number of women to men (although this gender representation is typical of the numbers of women in helping careers; women accounted for 75.7% of people in the Australian health workforce in 2006 (Australian Institute of Health and Welfare, 2009)). Relatively low response rates indicate that findings may not encompass the whole cohort; caution should be exercised before generalising results. In future, a larger sample across various counselling courses would be beneficial. Although international and domestic students were compared, care must be taken when interpreting results given this small sample, which was insufficient to compare the Hong Kong and Singaporean participants, an area of potential interest in future.

Counsellors represent one of many roles within the mental health profession, also including psychologists, psychiatrists, and psychotherapists. Given that it takes longer to become a psychologist (potentially influencing one's motivation for choosing this pathway), it may be worthwhile to compare and contrast counsellors with other mental health professionals, in regard to their motivation profiles and perceptions. It is important to consider why "Bludging" appeared a distinct factor with future counsellors but not teachers (Richardson & Watt, 2006). Teaching times and vacations are usually fixed, whereas counsellors often work in diverse settings, from agencies to self-employment, potentially allowing for more bludging. Future studies are encouraged to check the empirical distinctness of the bludging factor among other professional settings, which in this study was only moderately correlated with family flexibility.

Replication is needed to build on this knowledge and gain a more complete picture of intending counsellor's motivations. Future studies should assess whether career

motivations change after entering the profession, whether choice satisfaction and planned persistence remain steady or decline, and whether demand/reward perceptions alter as a result of experience. A longitudinal study is currently underway to address some of these considerations, within which the present data reside (www.cappstudy.com).

Conclusion

Using expectancy-value and FIT-Choice theory as primary frameworks, this study examined how career motivation factors combined to create profiles of future counsellors, how these profiles forecast choice satisfaction and planned persistence, and associations with professional demand/reward perceptions. Findings indicated four distinct clusters with varying motivational priorities, demonstrating the value of a person-centred approach. These findings shed light on the motivations of counsellors specifically, as a platform for further investigation into the motivations of mental health professionals. In identifying how different types of counsellors are motivated, important adjustments can be made by course providers and employers, to optimise high levels of satisfaction and planned persistence in the career. The development of highly capable and resilient practitioners may help ensure effective provision of mental health services to the population, and reduce the collective social and economic burden of mental health.

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From Cronbach to Brunswik: A conceptual framework for personality and individual differences research

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Recent personality literature has proposed that Cronbach's generalisability theory offers a substantive ground for the integration of inter-individual differences and intra-personal process approaches to personality trait research. Generalisability theory has the advantage of maximising psychometric dependability of behavioural measurements, but does not demand reconciliation to the environment that is relevant to the life circumstances of the participant. A conceptual analysis contrasting generalisability theory with Egon Brunswik's conceptual framework for psychology is presented. Recommendations regarding the connection between theory and methodological practice follow, in light of an evolutionary approach to personality and individual differences. An example that highlights the contrast between Cronbachian and Brunswikian approaches is presented, resulting in a recommendation to revisit the concept of ecological validity and representational research design, to better account for what is reflected in study outcomes for personality constructs.

Recent literature states that while there are substantial benefits to be gained from proposals for unification in psychology, there remains some problem with a failure to adequately address the disparate theoretical-epistemological commitments that underpin for example present-day personality theory (Poropat & Corr, 2015; Wood, Gardner & Harms, 2014; Cramer et al., 2012). Poropat and Corr (2015) track historical developments in personality theory via distinction between intra-individual and inter-individual difference accounts of personality traits. Research investigating intra-individual process dynamics is described as having roots in the experimental/laboratory methodology attributed historically to Wilhelm Wundt, while inter-individual differences research is recounted as having origins in the correlational hereditary investigations of Frances Galton, which later are adopted in the development of factor analysis, a technique which underpins for example the Big Five Model (BFM) of personality. Personality research is noted as typically grounded in either Wundtian or Galtonian bases, but not both. Further, any attempt to integrate Galtonian and Wundtian research remains problematic, as statistical analyses are conducted in incompatible ways. For example, even though there is a growing body of work that explores potential for explanatory neurobiological bases for personality factors such as openness or extraversion, there is no logical reason that any of the statistically derived inter-individually calculated BFM factors should explain biologically-based intraindividual processes in causal or evolutionary terms (Poropat & Corr, 2015; DeYoung et al., 2010; Wood, Harms, & Gardner, 2015).

A search for grounds for unification or coherence between inter- and intra-individual differences approaches led Poropat and Corr (2015) to endorse generalisability theory as a unifying framework. Generalisability theory is an ANOVA-based statistical approach to measurement error that works to evaluate dependability of psychometric outcomes (Shavelson & Webb, 1991). Poropat and Corr (2015, p. 60) claim that the systematised explication of measurement error lends generalisability theory the infrastructure that supports integration of disparate approaches in personality research. This paper examines this claim, and contrasts its outcomes with the benefits of a conceptual framework first set out by Egon Brunswik (1903-1955). The results of the conceptual analysis traversing both proposals suggest that environmental variables remain under-represented in generalisability theory. An example that integrates insights from both approaches is presented, but first we begin by reviewing generalisability theory.

Generalisability theory

Generalisability theory as first set out by Cronbach, Rajaratnam, and Gleser (1963) addresses the lack of differentiation of source for measurement error in classical test theory (CTT). CTT distinguishes true score from error for a given psychometric outcome, but makes no claim regarding the source, or systematised versus unsystematised nature of error properties (Shavelson & Webb, 1991). Tracking systematic error, generalisability theory maximises dependability of generalisations made from a study (Poropat & Corr, 2015). A psychometric outcome is understood as having facets in its composition, which include, for example, item, rater, form, and occasion characteristics, among others (Shavelson & Webb, 1991). In research design, facets are established for each factor included in a statistical model of the psychological phenomena, and an overall analysis of variation or error, and then the study generalisability, is conducted in light of these facets.

Proposal for generalisability theory

Poropat and Corr (2015) suggest that generalisability theory offers a framework for the integration of historical personality theories because it affords a systematic network by which the roles of intra-individual differences, the particulars of the research situation, and the influence of social others such as the researcher themselves in the formulation of personality assessments can be analysed for any given assessment scenario. Galtonian or inter-individual difference models such as the BFM are noted as aiming at but falling short of describing or explaining phenotypical or endophenotypical characteristics of behaviours that have genetic origins, as the models cannot account for the particulars of the situation within which behaviour occurs. Because of the inclusion of facets that provide a level of granularity about aspects of the research situation, Poropat and Corr (2015) state generalisability theory improves the accuracy of description of psychological phenomena, resulting in better explanatory power. With generalisability theory, for example, an observed score from a self-report administration of scale items may be decomposed into

means and effects in the following way (see Arterberry, Martens, Cadigan & Rohrer, 2014, p. 99-100), with a breakdown of effects visualised in Figure 1:

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observed score =

mean

+ item effect

+ occasion effect

+ person effect

+ (item x occasion effect)

+ (person x occasion effect)

+ (person x item effect)

+ (person x item x occasion effect)

+ residual.

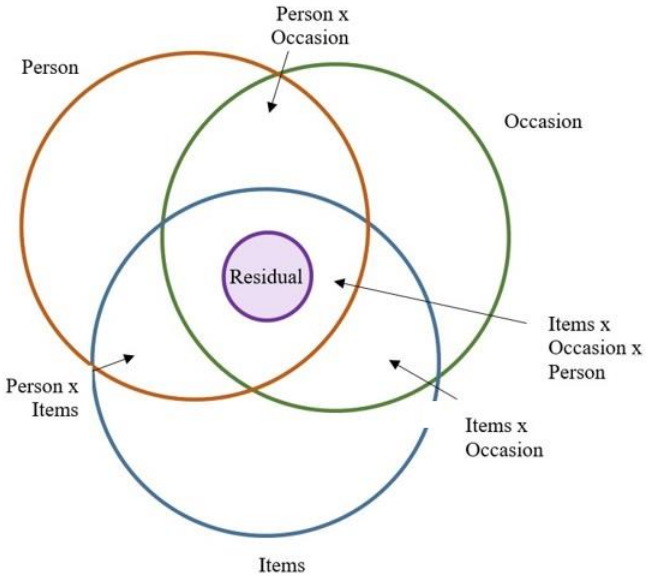

Figure 1 Generalisability theory logic diagram example

The decomposition is possible for any research situation where unique estimated mean variances can be identified for facets. A matrix is constructed to estimate facet intersections and examine patterns of systemic variation (Shavelson & Webb, 1991; see Arterberry et al., 2014, for example). Without such detailed analysis for statistical outcomes, the results of a study remain at best descriptive, rather than either explanatory or predictive, per Poropat and Corr (2015).

Need for conceptual analysis

Poropat and Corr (2015, p. 68) state that their proposal is one step in the right direction, but also that it falls short of what would best serve unification in personality research, stating that current methods remain overtly simplistic, and that what is needed is an ability to "model the measurement, context, phenotype, endophenotype and genotype of personality simultaneously" (p. 68). Big data presents both an opportunity and a challenge for personality research in this regard. Massive data warehousing lends the opportunity for longitudinal tracking of contextualising data, which serves to maximize the dependability of research outcome as is the aim of generalizability theory, while challenge is presented for personality research in that big data analysis suggests that prediction accuracy is enhanced by utilising online circumstantial behavior as predictors, rather than personality factors (see Kosinski, Stillwell & Graepel, 2013). This may mean that personality factors may serve optimally in an explanatory, rather than predictive capacity, and that the adopted principles of unification may be defined by what makes a good explanation, over and above what makes a good prediction.

Problems to do with circularity and reification for personality and individual difference factors where they are used in explanatory capacity are set out in Boag (2011). Boag suggests that these problems can be overcome where the biological properties of biological constructs may serve as an explanatory basis for personality factors. Such explanation is robust to the degree that properties associated with the personality factor can be independently asserted without reference to the behaviours that such a personality factor incurs. Notably here we see both reference to biological bases and a logical requirement for the independent referencing of the psychological phenomena of central concern in the explanation – a requirement compatible with Poropat and Corr's (2015) stipulations for unification, above.

Noting the admission of Poropat and Corr (2015), and the logical tests of Boag (2011), it is proposed here that while generalisability theory certainly offers an advance, it falls short of having the cornerstones needed to model genotype and endophenotype accounts of personality, as it misses a reconciliation between the study situation and the environment within which individuals persist, before, during and beyond, the study. It is in this external environment in which expected evolutionary implications for genotypes and endophenotypes will have most import. These environmental cornerstones are supported by adopting the conceptual framework set out by Egon Brunswik (1952), who sought to develop a research methodology informed by probabilistic functionalism, the idea that evolution is driven by the ways that organisms respond to their environments, which takes place in a probabilistic manner. We look to conceptual analysis as a guide for what is necessary, when bringing these terms into contact with personality constructs, and research methodology.

Conceptual analysis

Conceptual analysis remains underutilised, in psychological research, despite longstanding argument for its use (Rozeboom, 1977; Machado & Silva, 2007; Petocz & Newbery, 2010). Conceptual analysis takes as object any elements relevant to statements made under the scientific method, which include "concepts, terms, variables, constructs, definitions, assertions, hypotheses, and theories" (Petocz & Newbery, 2010, p. 126). The process includes clarifying implicit assumptions in arguments and chains of inference, as well as other steps such as resolving semantic ambiguity and examining refutability of hypotheses (Machado & Silva, 2007; Petocz & Newbery, 2010). Implicit assumptions about the nature of causation and the role of the environment in the proposal for generalisability theory are discussed in what follows, below.

The gene-behaviour-environment gap

Poropat and Corr's (2015) proposal for generalisability theory goes some way towards addressing concerns about the explanatory capacity of personality factors, by addressing a level of granularity not typically otherwise tracked in the research situation. The authors maintain however that for those factors calculated on the basis of between-subjects variances, such as the BFM factors, there remain no logical grounds for ascribing a causal or genotype-role for these, to individuals, as there is no one individual reflected in the construction of the model and its factors (see Saucier & Goldberg, 2001; Lewontin, 2006). Nor can the factor serve in an endophenotypic role (where for example individual attentional processes have import for behavioural expression). What is missed in any regard is reconciliation between the study situation and the environment within which organisms persist outside of the study context. We turn now to examine probabilistic functionalism as an evolutionary theory-informed account, of personality phenomena. Here there is a role for the environment in personality phenomena, as a function of biologically-based organism-environment relationships.

Probabilistic functionalism

Probabilistic functionalism is a Darwinian approach to psychological phenomena and research methods developed by Egon Brunswik (1939). In common with other more recent proposals (see Petocz & Mackay, 2013; Marsh & Boag, 2014), Brunswik (1952) characterises psychological phenomena as situated *within* organism-environment relations. Brunswik's (1952) conceptual framework is novel in that: i) individual differences in psychological phenomena are understood as situated in organism-environment relationships, with the organism and environment individually regarded as a unique and interacting *system* (Hammond, 1966); ii) it requires that variation in *the environment* is systematically tracked, with environmental variation considered as at least as important as variation both within and between, individuals.

Brunswik's (1952) probabilistic functionalism places emphasis on an organism's probabilistic sensing of and adaptation to an ever-changing environment, where variation in the environment is at least as influential for psychological phenomena as processes within intra-organism systems, themselves. Beginning in investigations of object-constancy in perception psychology, Brunswik (1939, 1956) understood object-constancy as a kind of paradox, where there is not a singular one-to-one relationship between object and perception, rather, the perception-act is a function of complex interaction and mediation processes. These systems or processes have intra-individual as well as organism-to-environment aspects, so that variables may interact or mediate just within the individual, or within the environment, or may interact with and mediate the organism-environment relation. There are implications then both for events occurring in a given research study, and events shaping how object-perception occurs naturally in the environment, for the organism, which must be addressed in research methodology (Brunswik, 1956). For example, when considering the cue to behaviour for a rat upon perceiving a food- stimulus, experimentally-informed methodology assumes that the food-stimulus is infinitely available. In naturally occurring environments food will occur with probabilistic frequency for a rat, which prompts different cue-behaviour actions, for example, when a food source is exhausted. For Brunswik (1939, 1956), this kind of study-environment disparity asked that we play close attention to, and make systematic record of correlations at the level of the environment, and also at the level of the organism-environment relation, as much as research protocols informed by the Wundtian experimental paradigm were already rigorous in their attention to intra-individual variations, given study manipulations.

In deriving the original form of ecological validity, Brunswik (1952) distinguished between the influence of distal variables, such as those at a geographic or historical distance from the study setting, and proximal ones, which may lend themselves to intervention but upon which the effects of intervention were unpredictable, because of the influence of distal variables. Correlational analyses of environmental impacts upon the organism facilitate the production of a model of the *causal texture* of the organism's encounter with the environment, such that precise modelling of both systems and their interactions is necessary (Tolman & Brunswik, 1935). Brunswik (1956) noted, for example, that it was vital to correlate study outcomes over expected environmental changes, for him this was the only way to properly conceive of and account for the evolutionary implications of probabilistic functionalism. For Brunswik (1939, 1952, 1956) what was vital for the future of psychology was a shift from the organismic focus of systematic design, which had privileged experimental certainty at the expense of ecological generalisability, to a representative approach to study design, which accounted for the way in which the environment changed. For Brunswik this meant that at best, psychology could produce probabilistic explanations for its phenomena of interest.

Causation in psychology research

This account of probabilistic functionalism presents an interesting twist in light of recent accounts of causation relevant to personality factors investigated in factor analytic or latent variable modelling approaches. In "*Measuring the Mind: Conceptual Issues in Contemporary Psychometrics",* Borsboom (2005) claims the way that psychology researchers use the latent variable model (LVM) in statistical analysis suggests that all such researchers are realist in their commitments, taking between-subjects self-report test scores as caused by an underlying, real, psychological phenomenon or attribute. In this way, for example, extraversion, which is not directly observable is given to cause, self-report test score outcomes that are indirectly measured by the LVM. While the set of assumptions regarding realism and causation for the LVM remain subject to question (see Nowland, 2014; Poropat & Corr, 2015), and, although Borsboom (2005) himself points to problems with interpreting between-subjects or inter-individual differences as having causal efficacy in the real world, recent developments may have compounded these unresolved dilemmas. The dynamic network model (DNM) has recently been proposed as an advance over the LVM because in the view of its proponents it represents transcendence of problems to do with directionality in causation for latent variables (see Cramer et al., 2012). In the DNM, causation is free to run in any direction, between variables, rather than requiring that the latent variable, such as extraversion, *causes* observed outcomes (Cramer et al., 2012). Proposing that personality is made up of components of affective, cognitive and behavioural systems which may act causally on each other, Cramer and colleagues suggest that data can freely tell the story about interactions between these systems when utilising the DNM. In this way, for Cramer and colleagues, the DNM represents an advance over the LVM because in their view it steps closer to the 'truth' about causal relationships.

Brunswik's (1956) view of cause and effect in producing psychological phenomena is both more general and more precise than both that of the somewhat permissive DNM, where cause and effect run freely between intra-individual factors, and also compared to the LVM, with its assumption of a one-way casual relation between the factor and scores, calculated on between-subjects data. It is more general as the *causal texture* of the *environment* in probabilistic functionalism implies that several different stimuli may be given to cause the same observable outcome. Exhibition of extraversion for example may for some individuals be equally likely in the presence of a single other individual, as it is likely demonstrated at a party, but this is not true for all individuals. In this way, Brunswik's (1952) conceptual framework is more precise, in its account of causation - it claims that what is usually the 'effect' in a causal explanation for psychological phenomena also has a relevant causal influence– the environmental event as an 'effect' serves in some ways in a causal role, for psychological phenomena, as well. Causation has clear bi-directionality, and this is the basis of representative design of research, which Brunswik (1956) saw as an advance over experimental design, to the

degree that it demands a detailing of the role of the environment in the production of psychological phenomena, or attributes.

Brunswik (1956) states that research methodology should thus include analysis of the effect of subjects encountering the study situation including the self-report scale, in the environment of social relations that make up the fabric of an individual's experience within a cultural context. Conceptually, variation in environments of social relations, or the differences between for example, the three situations of a party, everyday life, and a study context play an important role in what is assessed, in test-score outcomes for personality variables such as extraversion, and this variation must therefore be included in the overall analysis of a personality attribute, within a psychology research study, following Brunswik (1956) (see Figure 2). These variations can be systematically tracked and correlated to produce a modelled version of the causal texture of what it is that individuals encounter, in study and environmental contexts, that produce certain personality phenomena, for observation by researchers. Logically, for Brunswik (1956), without adequate attention to the explanatory generalisability of a study to the environment relevant to the organism or subjects in question, the induction or generalisation from study participants to a broader population as sought in statistical analysis of research outcomes is simply not possible. Generalisation fails because we have not been precise enough in defining the conditions in which say extraversion can be expected to occur.

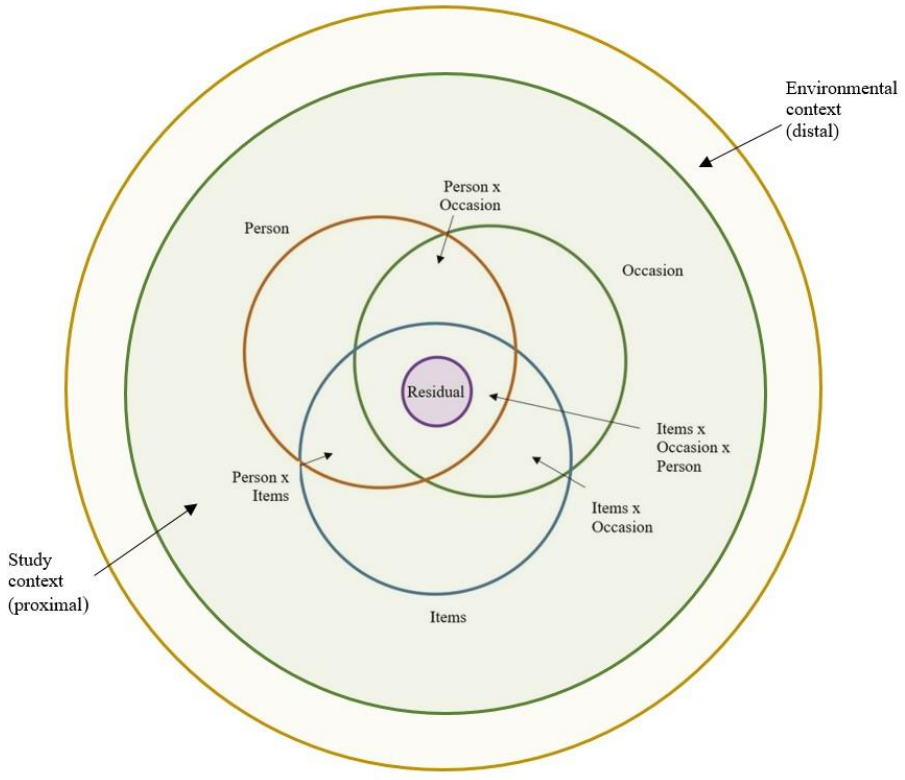

Figure 2. Conceptual framework logic diagram example

Implications for Poropat and Corr's (2015) proposal

While generalisability theory works with variables internal to a given study structure such as items, persons or occasions of administration, Brunswik's (1956) ecological validity works to extend concerns for generalisability beyond these terms to say that correlational analyses of the organism's environment must also be included in the analysis and reporting of outcomes for psychological research. Not only intra-individual differences, but intra-ecological analysis which maps the study variables to physical-environmental organismic situations is vital to be able to make meaningful statements about the study outcomes in the context of individual differences (Brunswik, 1956; Hammond, 1966). Examples of how this could be done may involve triangulation of observer and self-report test outcomes, with the observer noting individual responses in environmental contexts such as the study setting, and a party setting. It could also involve asking subjects to respond about elements of the environment considered relevant to the attribute or variable in question. In any regard, the effect of any study questionnaire on the individual who fills it out should in some way be represented, in research outcomes. This begins to make room, for example, for cultural differences that may inform perceptions of first-person statements in self-report items (see Saucier & Goldberg, 2001), or the possibility that for one individual different environments generate different expressions, of personality.

Recent example

Arterberry et al. (2015) conducted a generalisability analysis of abbreviated Big Five item scales, on three different time intervals, with 44 total items and then 10 total items (2 per factor), across 264 American Midwestern university students, on item, occasion, and person bases. Findings suggested that dependability was enhanced with the larger item set, and that person-by-item variance accounted for the most variance after person variance. Adding insights from Brunswik's (1956) representative design, work prior to the beginning of the participant involvement would include working to estimate stimuli relatedness to environmental circumstances, in this case, perhaps an estimate of an item's meaningfulness in light of the purpose of the administration of the scale, which had formed part of a study of alcohol use, on campus. Contextual elements of psychology research studies have recently been demonstrated to play an important role in reproducibility (see Van Bavel, Mende-Siedlecki, Brady & Reinero, 2016). Representative design offers a systematised means by which contextual elements can be traced and accounted for in relation to not only psychological but more broadly, scientific research (Van Bavel et al., 2016).

Conclusion

Poropat and Corr (2015) point out that not infrequently the same self-report items are featured in analyses notionally at different levels of evolutionary mechanisms, such as at endotype versus phenotype levels of analysis. Such a conflict remains problematic for meaningful discourse regarding the relationship between variables at these different levels, and thus for personality as a feature of human beings. In their words, “adequate integration of personality models will require reliable assessment and analysis of intra- and inter-individual processes and variation, combined with attention to both the expression and perception of personality” (Poropat & Corr, 2015, p. 66). Generalisability theory offers a first step in improving awareness of intra and inter-individual aspects of the study situation, but it does not address the deeper concern of how evolutionary mechanisms have played a role in the expression of personality traits that can be tracked in a study context. Brunswik’s (1952, 1956) conceptual framework asks us to account for the impact of several researcher decisions - the choices of variables to represent phenomena, manner of variation within variables, manner of concomitant variation between variables and the effect of variables on each other, and the connection to the environment in terms of whether they are artificially tied together, artificially given to interlock, or artificially untied must be systematically stated. The impact of researcher presences in social relations to participants also has a place for analysis in both generalisability theory and conceptual framework approaches, with the added advantage in a conceptual framework of being matched in some way back to the environment most at question for the sample pool of subjects and presumably, their population.

Brunswik (1955) states psychologists enacted a “double standard” in their inductive inferences - we carefully specify our inductive generalisations for participants, but pay no heed to inductive generalisations for environments. Following the outcomes of the 2015 replication crisis for psychology, we are well served today to shift our research practices in the direction of more detailed methodology and rigorous reconciliation of the study context to the environment within which the personality phenomena is given to occur. As big data approaches represent the opportunity to confirm it, we may in time come to understand confirmation of ecological validity as logically preceding tests of reliability, for explanatory outcomes from any given study.

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A reflection of children's ways of thinking: A qualitative study exploring how thinking style factors may emerge through hearing the child's own voice

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To further understand individual differences (IDs) in how people think, this project aimed to build on the Ways of Thinking (WOT) model through listening to children about their own thinking: Do the WOT factors readily emerge from such voices? Eighty-four parents of 9-12-year-old children were surveyed online for reflections on their child's ways of thinking using the Children's Ways of Thinking (CWOT) questionnaire. On the basis of CWOT parent responses and consent, a sample of 12 children was selected for the qualitative group research component. Each researcher conducted semi-structured interviews guided by CWOT questions with 3 of the 12 children. While researchers were blind to original CWOT scores, they were each allocated a set of three who displayed a strong presence or absence of two specific factors of thinking. Thematic analysis explored the commonalities and patterns in the interviews, finding that the WOT model factors of Surgency, Creative, Controlled, Ideaist and Freethinking did emerge from the children's own voices. Support was also found for the facilitation of Ideaist, Surgent and Creative thinking in the absence of Controlled and Closed-minded thinking. Implications for future research for further exploring how children think are discussed.

The psychological study of individual differences (ID) seeks to study similarities, patterns, and differences in how people think, feel and behave. Predictive validity is an important aspect for understanding such differences. Research surrounding IDs explores many predictive relationships, including with personality, behaviour, attitudes, motivation, intelligence, occupational interests, responses to given stimuli, even IDs in humour (Cooper, 2002; Galloway, 2010; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003).

Style overview

The term "style" is used in a variety of contexts in everyday society to describe individual likenesses and differences; from fashion, the arts and media through to many academic disciplines. In psychology it has been developed in conjunction with areas such as personality, cognition, communication, motivation, perception, learning and behaviour (Rayner & Riding, 1997).

The notion of style has wide appeal and enduring versatility, although its indiscriminate overuse has often created difficulty in understanding and defining the concept. In psychology, however, style is nonetheless predominantly associated with individuality and used to describe an individual quality, characteristic, form, activity or behaviour displayed over a period of time (Conti & McNeil, 2011; Rayner & Riding, 1997).

These style dimensions can be conceptually different but similar in that they may all be differentiated from abilities. Abilities refer to what and how well a person can perform, compared with style which refers to personal preferences in using or managing their abilities (Sternberg, 1994; Zhang, 2002, 2013).

Styles have become recognised as a way of conceptualising fundamental IDs based in human cognition that interact with a wide range of human performance variables such as learning, management and task performance (Peterson, Rayner, & Armstrong, 2009; Zhang, 2011). While the term style covers many contexts in everyday life, many are beyond the scope of this project; in this research we will only consider those that are related to thinking.

Thinking styles

Thinking styles, considered to sit comfortably within the domain of cognitive style (J. Roodenburg, 2003), refer to one's modes of thought and preferred manner of expressing their intelligence and knowledge (Grigorenko & Sternberg, 1995).

In an investigation of cognitive styles as they relate to cognitive development in university students, Zhang (2002) found varying degrees of support for the overlap between cognitive thought and "thinking styles". For example, students who reasoned at a higher cognitive developmental level tended to use a wider range of thinking styles than students who reasoned at a lower cognitive level. While overlapping, however, the two constructs were still separate with some key differences. For example, thinking styles tend to be more flexible whereas cognitive developmental levels are more stable (Zhang, 2002).

Definitions of thinking style vary within the literature: from sets of reasoning strategies individuals are inclined to apply (Fabbri, Antonietti, Giorgetti, Tonetti, & Natale, 2007); how individuals have preferred ways of thinking to make use of personal skills during stressful events (Hassan, 2014); how one prefers to think about the material they are currently learning or have learnt (Zhang, 2001); and to how sets of functions are used by individuals for problem solving (Belousova & Pishchik, 2015).

Thinking styles have been described as one's preferred way of thinking about information processing in learning, or simply, one's preferred way of using their thinking abilities (Zhang & Sternberg, 2005). Thinking styles have previously been investigated through the use of models such as Sternberg's Theory of Mental Self Government (Sternberg, 1988) and his Model of Thinking Styles (Sternberg, 1997). These specific style terms allowed for a more focused investigation of style, how it is developed, and what influence it has on individual functioning.

A common theme of thinking styles is to consider them a function of individuals' interactions with and adaptations to the stylistic demands of tasks and situations (Sternberg, 1990; Sternberg & Grigorenko, 1997). Rather than rely solely on one thinking style alone, an individual's profile can be seen as a varying ratio between thinking styles (Balkis & Isiker, 2005; Belousova & Pishchik, 2015). In this regard, different thinking styles

are not inherently better or worse; their value is largely dependent on time, situation, and culture (Zhang & Huang, 2001). Hence, individuals not only differ in their utility of thinking styles but also in their ability to switch between them (Sternberg, 1990). Additionally, individuals with similar personalities and abilities may differ in thinking styles (Balkis & Isiker, 2005; Grigorenko & Sternberg, 1997). This suggests thinking styles are distinct from personality and abilities, supporting the view that they lie at the interface of abilities and personality (Sternberg & Grigorenko, 1995), rather than being inherent to either domain.

Ways of Thinking model

Identifying the factors that underlie thinking have been particularly difficult in regard to the construct differences in thinking. It is not readily observable and measurable, making it difficult to gauge how thinking manifests differently from person to person (Ritchhart & Perkins, 2008).

The WOT and CWOT grew out of a psycholexical model that was developed as a robust measure of how people prefer to think. The model was personality-centred as opposed to abilities-centred and presented an understanding of late adolescent student ways of thinking (SWOT) as reported by their teachers. Six higher order factors of personality-centred cognitive style were identified with clear lower order facets associated with ways of thinking: Surgent, Creative, Controlled, Intuitive, Freethinking and Sensate (J. Roodenburg, 2006; J. Roodenburg & Roodenburg, 2009). Later research has validated and operationalised the structure of Roodenburg's 2006 SWOT model (Costello, 2016; E. Roodenburg, 2015) while adjusting some factor names, Figure 1.

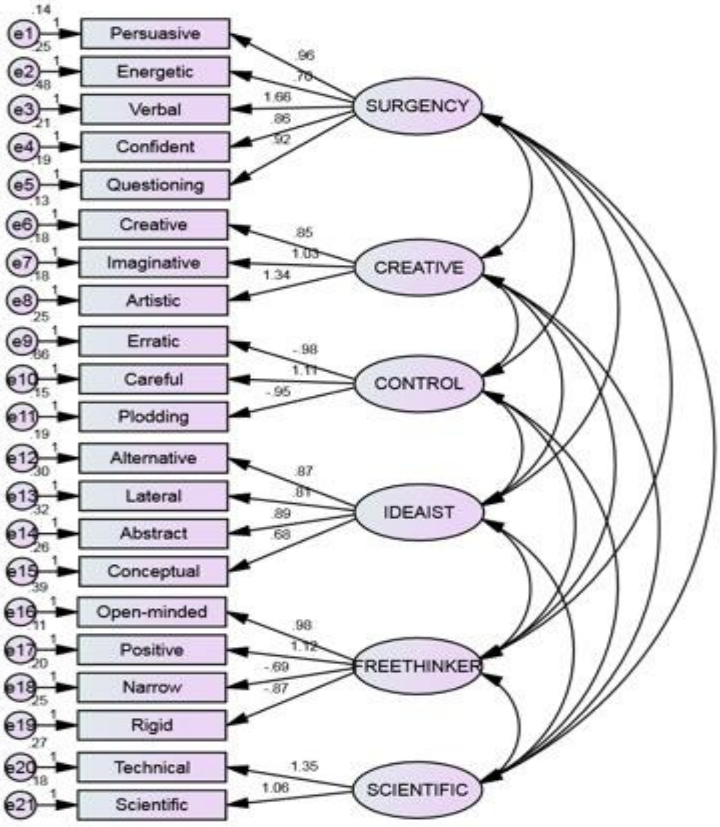

Figure 1. Ways of Thinking Model (Costello; E. Roodenburg, 2015, adapted from J. Roodenburg, 2006)

E. Roodenburg (2015) further explored IDs using the SWOT model, in a mixed-method approach to deepen the understanding, operationalise, and validate the measure. Costello subsequently applied structural equation modeling techniques and further validated the Ways of Thinking model in an adult self-report sample. The following describes the factors.

Surgent thinkers are able to convince and influence others to change their minds. Such individuals are alert and active in their thinking and are able to vocalise and express their thoughts confidently. Surgent thinkers are also said to have probing thoughts and to ask penetrating questions (Costello, 2016; J. Roodenburg, 2006).

Creative thinkers tend to think outside the square, they enjoy exploring alternatives with imagination, picturing potential options, are versatile in finding solutions, can be often inconsistent and are highly original thinkers. These individuals explore alternatives with imagination and are versatile in finding solutions. They can graphically describe things, and sensitive to and aware of aesthetics (Costello, 2016; E. Roodenburg, 2015; J. Roodenburg, 2006).

The factor of Control is a bipolar one suggesting controlled thinking versus non-controlled thinking, with all three facets suggesting either a positive and deliberate control or its notable absence (J. Roodenburg, 2006). In a Control way of thinking there is a reflection and focus on the process of thinking, with individuals either liking or not liking to think in a controlled way.

The Ideaist factor was initially termed Intuitive in the J. Roodenburg (2006) Ways of Thinking model. This was often muddied by the earlier and varied traditional notions of what intuitive implies and a new term, Ideaist, was coined on the basis of a little used term (Costello, 2016; E. Roodenburg, 2015; E. Roodenburg, Reupert, & Rayner, 2016). The Ideaist way of thinking, as refined through the model building process of the WOT, describes individuals who focus on ideas and abstract concepts, understanding the meaning behind the facts; imaginers, dreamers and those who perceive thinking as a pleasurable activity (Costello, 2016; E. Roodenburg, 2015; E. Roodenburg et al., 2016).

The Freethinker is one that tends to be open-minded and positive in their manner of thinking while actively working to inhibit a negative mindset. However, they may be occasionally susceptible to thinking in an inflexible and limited manner, such that they focus on a small component of a task or larger idea.

The Scientific factor was initially termed sensate with the name was changed to Scientific to better depict and encapsulate the facets. Scientific thinkers desire to know how things work, are logical systematic thinkers and enjoy considering technical details of problems.

Thinking styles - research with children

Children's voices have previously been largely overlooked in research, perceived to be from unreliable respondents (Eiser & Morse, 2001) not met with the same reverence as that of adolescents and adults (Ritchhart & Perkins, 2008). A lack of ID research investigating children's own experiences and perspectives was identified by Hill, Laybourn, and Borland (1996, p. 129) stating "studies of children have a long history in psychology, but for the most part they have been investigations on rather than with children". The current research seeks to address this need, focusing on children's ways of thinking as understood through hearing their perspective.

De Fruyt et al. (2006) had found evidence of different types of *personality* continuation through childhood and adolescence, demonstrating the level is higher than previously expected. Given the links of ways of thinking with personality found in older students and adults, could there also be a stable continuation be similarly found in children?

Previous research developing the WOT model looked at IDs in thinking in secondary school students and adults. The current overarching research focuses on children in the 9–12-year-old age group and their reflections on their own thinking, such having implications for understanding how they develop and learn.

Qualitative methodology and issues

Previous and current research has predominantly relied on quantitative methodologies to conceptualise thinking styles (Sternberg & Grigorenko, 1993), however the usefulness and benefits of qualitative methodologies is gradually gathering importance (Alise & Teddlie, 2010). In order to better understand an individual's makeup and their IDs in thinking, a deeper, more idiographically based understanding is desirable.

Approaching the human person as a whole is regarded as an essential component of qualitative research; through phenomenological research, the individual's subjective experience can be emphasised and heard (Giorgi, 2012; E. Roodenburg et al., 2016; Wertz, 2005). The phenomenological attitude attempts to be free from judgment and focuses on the meaning of the subject's own perspective and experience (Wertz, 2005). In this approach, the researcher considers not only what is experienced by the participant but also all processes and information that is available to them. These include body language, patterns of speech, emotional, imagination, social and behavioural observations that make up a more comprehensive picture of the participant and their particular way of thinking.

Through a qualitative approach, the researcher begins with specific observations and allows categories and themes to emerge through the participant's own experience. The participant is in their own setting and the researcher's role is to make sense or interpret phenomena through the meanings the individual participants give to them (Mertens, 2015).

Qualitative research will allow us to consider and contextually hear the child's voice through speech, body language, and content analysis, open to aspects that may emerge from their own individual ways of thinking.

Aims of project

The primary research question investigated whether through hearing the children's voices about their own thinking, and analysing their understanding, do *the factors* of thinking style emerge. In so doing,

1. This present study also aims to seek a *greater understanding* of thinking style through what the child expresses about their own thinking.
2. Moreover, the study aims to replicate previous findings (E. Roodenburg, 2015; J. Roodenburg, 2006) through the use of a solely qualitative approach.
3. The current study may also be useful as indicating the potentials of qualitative methodologies for investigating IDs in children's way of thinking.

Method

Ethics Statement

The current study was approved by the Monash University Human Research Ethics Committee. All participants were given verbal and written information about the study and gave their informed consent to participate.

Participants

The initial participants in the study comprised 84 parents of children aged between 9-12 years old. On the basis of CWOT parent responses and consent, a sample of 12 children was selected, comprising 6 girls and 6 boys. Three children were allocated to each of four qualitative researchers.

Materials

Children Way of Thinking Questionnaire (CWOT)

The CWOT is an 83-item questionnaire that was completed online by parents to evaluate their perception of how their children think. Items were rated on a 7-point scale, ranging from 'Not at all' to 'Always'. Examples of statements are, 'How much do you think your child thinks erratically', and, 'Your child likes open-ended thoughts'. The CWOT has previously demonstrated an acceptable level of reliability ($\alpha = .74$), with Cronbach's α ranging from .56 to .86 (E. Roodenburg, 2015).

Semi-structured interview script

The research interview script consisted of 19 open-ended questions based on the CWOT. Examples of these questions are: 'What sort of things do you find yourself thinking about?'; 'What do you sort of like about your friend's way of thinking?' Questions were used flexibly and adapted to the context of each interview. Researchers adopted a 'talking back' stance (Taylor & Ussher, 2001) with each child as a means of avoiding a 'stop-start' flow to the interviews. This allowed the children to expand on their responses and clarify any misunderstandings. As a result, non-scripted questions differed between interviews.

Procedure

Twelve children were allocated by the research coordinator to four researchers according to their thinking factor loading patterns based on parent CWOT responses. Each child was interviewed and audio-recorded, with interviews lasting between 30 to 80 minutes.

Results

Data Analysis

In accordance with Braun and Clarke's (2006) recommendations, a thematic analysis was conducted of interviews. The analysis covered the children's responses collectively to identify and examine commonalities and differences in the entire data set rather than each child or open-ended question separately. Building on previous research (Costello, 2016; E. Roodenburg, 2015; J. Roodenburg, 2006), a theoretical perspective was initially taken and analysing the emergence of each ways of thinking factor took precedence. Subsequently, an inductive analysis led to the emergence of different categories which were coded accordingly. Passages yielded clear illustrations of each category, highlighting their prominence and what experiences may have been in common amongst the children.

Interpretation of these categories was developed by revising related literature, re-reading the interview transcripts, and discussions amongst the researchers. With this process of refinement, definitive themes were established.

During the data analysis process, evidence of all the Ways of Thinking factors did emerge. The following interview excerpts of responses provide examples of some of the evidence supporting the emergence of Ways of Thinking.

Surgent thinking

Evidence of the Surgent factor emerged in seven of our case studies. The individuals who displayed Surgent thinking spoke with confidence, displayed an active mind and vocalised their thoughts well.

- *Do you think a gorilla pack is just going to come out of nowhere? and just like, Uhuhuhuhuh! Jumping you in the air, and just like, Ahhhhhahhh! splatter you in the neck area? Just no. It's not going to happen. So I don't think I would have learnt anything.* (persuasive and confident)
- *you work out how you're gonna do it and then when you do it… you're just like yeah you just feel this sense of achievement, then you go onto the next hard subject* (energetic)

Creative thinking

The ten children who displayed evidence of the Creative factor were aware of aesthetics, generated novel possibilities, and diverged from straight thinking. They explored alternatives with imagination and graphically described their thinking. Examples include:

- *You're not smiling on the inside or the outside...it's just kind of like a cloud's just gone over.* (artistic)
- *Your thinking is kind of...it's scared like it's trembling.* (artistic)

Control

Control thinking facets that emerged in four of the children were Careful, and Plodding with Erratic as the antonym. In some cases, Control thinking only emerged in the absence of Surgent, Creative and Ideaist thinking.

- *Carefully, to cautiously think before acting .... I like to think and I like to make sure it's correct, like we're doing a test or something - I don't just go like nonstop. I take time, take a breath and see if, check over the last few answers* (careful)
- *I think it affects because if you are thinking of, like, you are doing a maths problem, like straight after lunch and you were in a fight so you might be thinking about that person, and that you really want to hurt them, and then you won't think about the work you are meant to do* (erratic)

Ideaist

The Ideaist factor emerged in five of the case studies, displaying a focus on ideas and abstract concepts.

- *I like to have lots of time to think because then you would probably get it right and also if you do it too quickly, you might not even think about it all* (abstract)
- *And I've been waiting to be 11 for a long time. It's the first time being like one and one and then you have to wait for a long time to be 2 and 2 and then 3 and 3* (abstract, conceptual)

Freethinking

Evidence of the Freethinking factor emerged in three of the case studies with children having a profound liking for open-ended thoughts and emphasising the need to think positively.

- *It just, it just, everything negative comes into my brain. Like, "Think positive! Think positive!* (positive)
- *I sometimes daydream randomly. I don't know why. I just start daydreaming. Like I just start staring for a few seconds and I think.* (open-minded)

Scientific

Scientific thinking facets emerged in six of the case studies, including evidence of logical systematic thinking, and the enjoyment of considering the technical details of problems.

- *Weight. Like if it's heavy and you know, we were going over swamp ground, it would, would it sink into the ground and get bogged?* (technically)
- *I like to get a piece of paper and I like to draw out things... When I plan something like what my bedroom would look like, I would normally place the things that are always in the same spot, like my cupboard and my windows and things* (scientific - logical and systematic)

Through the inductive analysis process, further themes emerged as transcripts were discussed between the four researchers. Some of these themes were then conflated into two broader themes: Awareness of thinking and Influences on thinking.

Awareness of thinking

This theme grouped together the awareness a child had of both their own thinking and thinking in other people and how they described it. This included awareness of their thinking in parents, friends, unusual and different thinkers.

- *Like for instance a pile of pencils… how I might think how could I organize them cos I'm an organised person… I like to be organised and she is more creative so she might go - what can I draw with those pencils?*

- *I think…well my teacher – well she would have to think a lot in details to help explain if someone doesn't know…*

Influences on thinking

This theme grouped together both external and internal influences on the children's thinking such as hobbies, situations, and feelings (emotions).

- *Yeah, if you're happy you think about it on the happy side of it so like, if you have to go to like your brother's friend's birthday party then maybe someone you know might be there or if you're thinking sad then… I'm gonna be all alone there with really annoying boys.*
- *Well, I like doing both, but it depends what I'm doing. Like, I like being busy and not stopping when I'm with friends, and then I like being quiet when I'm, I guess, when I'm doing homework.*
- *When you get so frustrated that you are thinking too much and when you explode and you just, it comes out. (And what do you do then?) You just get really angry or something… At nothing!*

Discussion

In relation to the main aim of exploring children's ways of thinking, all six Ways of Thinking factors emerged through hearing the child's own voice. Each researcher focused on different Ways of Thinking factors and various patterns emerged. In some of the cases, factors such as Surgency and Creative emerged more readily in the absence of other factors, such as Control and Scientific. There were some cases that also showed a pattern of Surgency, Creative and Ideaist emerging together in the absence of Control or Closed-minded (opposite of Freethinking). With Controlled and Closed thinking considered obliquely related to Ideaist, Surgent and Creative, this finding is consistent with the Ways of Thinking model speculation: the absence of Controlled thinking facilitates Ideaist, Surgent and Creative thinking styles (J. Roodenburg, 2006). However, even though Surgency and Creative appeared together in some cases, there were differences in how the two factors emerged. Researchers observed that in some cases, the Surgency thinking style factor seemed more apparent and emerged sooner in conversation, compared to Creative thinking. Surgent thinking can embody somewhat loud and dominant qualities, suggesting it may be more likely to be distinguished in a face-to-face context. Creative thinking may emerge more slowly, and not be as apparent.

Interestingly, in some cases, the children who displayed characteristics associated with high levels of creative thinking appeared to show lower levels of Scientific thinking. The fact that the characteristics associated with Creative and Scientific thinking styles are quite divergent may help towards explaining why Creative thinkers may not employ a more methodical, logical manner of thinking that is associated with Scientific thinking. Inversely, in some of the cases, children who displayed Scientific thinking also displayed lower levels of

both Creative and Freethinking thinking. The Freethinking factor emerged in some of the children, tending to emphasise a positive mindset and sometimes finding themselves to be consciously inhibiting pessimistic and negative thoughts. They demonstrated the capacity to be open-minded and they welcomed differing opinions and suggestions by their peers. Collectively, these findings may suggest that the children enjoy their thinking when it is free flowing, positive and unbound, leading to exploration and experiencing different ideas and situations.

In some of the cases displaying Control, the children showed great focus and caution in their thinking in order to avoid any negative situations or conflict. Within the Control thinking factor, there was evidence of a susceptibility to being erratic, especially in unknown or unpredictable contexts or situations, preferring instead to stay within what is predictable and safe.

In relation to facilitating greater understanding, replicating findings, and the appropriateness of qualitative methodology in this area, one of the main strengths of the current research is that in hearing the child's voice we did indeed gain a privileged "inside" view of their ways of thinking. Using qualitative research, the child's voice and our reflections enabled us to successfully explore what came up in the interviews and focus solely on the child's own perspective, remaining open to what may emerge. The findings from the current study further validate the WOT model, adding support to its validity and the use of qualitative research. Children have demonstrated that they have the capacity to share insights into their understanding of thinking, an area that has been relatively unexplored in previous research.

Further Strengths, Limitations and Future directions

Possible contributions to be considered in regard to the IDs in the children interviewed include the bidirectional impact of personality on ways of thinking. Through the current study and subsequent research into the ways of thinking and personality, further information may come to light on how an individual's personality and ways of thinking may shape each other. Gender is another possible contribution to the differences between children. How much of the differences in the children could be related to thinking styles and how much is due to gender-based differences? Or are thinking styles actually part of the gender-based difference? In meta-analyses examining gender differences in children's language use, girls were found to be slightly more talkative and used more affiliative speech than boys, who used more assertive speech than the girls (Leaper & Smith, 2004). These differences in language use, for example, could be connected to a Surgent way of thinking and its facets of Verbal and Persuasive.

Due to the qualitative nature of the study, exploring the ways of thinking in children was limited to a small sample. While the WOT factors did emerge within the small sample, it was difficult to consider the differences, similarities and patterns and ascertain what may have been affecting or influencing these from the child's perspective. It must also be noted

that although the children demonstrated the capacity to reflect on and express their understanding of thinking style, researchers acknowledge that responses may not be as formal or rational as those of adults (E. Roodenburg, 2015). There is a reluctance to generalise from one child to another with differing life situations, levels of maturity and abilities to conceptualise thinking differing considerably. Future research may benefit from developing larger sample sizes and perhaps seek to control for factors, such as school year level, family dynamics or gender differences.

The thematic analysis process involved the subjective interpretations of the researchers. Given the recency of the WOT model factors and their facets, the definitions of the factors themselves were also quite fluid and there may have been differences in interpretations and understanding. With the emergence of each factor for ways of thinking taking precedence, researchers may have coded information that did not fully correspond with the respective facets. Therefore, certain factors may have been overrepresented or underrepresented in the analysis at the expense of a more objective illustration of the children's thinking.

Future interviews could include alternate methods of information gathering from the children, including play or art therapy, which may allow different factors to emerge, or add further evidence of previously seen factors. Play therapy in counselling is considered a vehicle enabling children to communicate their experiences and inner awareness in a language familiar to them (Trice-Black, Bailey, & Kiper Riechel, 2013). Using imagery in art therapy has been used as a means of tapping into a child's ways of knowing and reacting to the world around them, allowing the researcher a way to enhance and discover more about their emotional and cognitive development (Bitonte & De Santo, 2014; Riley, 2001).

With this study being the first of its kind to explore thinking style in children using the WOT model, it sets the precedent for future research. Given the study's promising findings and limitations, future studies may take confidence in embracing qualitative methodologies and using children as their subjects. Incorporating E. Roodenburg's (2015) previous work interviewing older adults, semi-structured interviewing has demonstrated usefulness in realising richer understanding of how individuals conceptualise and understanding thinking.

Moreover, considering the theoretical aspect that thinking styles may develop at different points in one's life span(Sternberg & Grigorenko, 1997), and the previous research conducted with adolescents and adults, the next step may necessitate longitudinal studies. They are yet to be utilised in thinking style research, and may be unequivocal in demonstrating the development of one's thinking over a period of time.

Implications

The results of the current study provide important implications for a wide area of research. Children have the capacity to share insights into their understanding of thinking and appear far more able to express themselves than previously assumed; future research may consider investigating areas relevant to children, through hearing their own voice

instead of employing proxy raters. This study may prove to be a catalyst in research on the child's voice, demonstrating the true value of such research endeavours. In addition to this, the clarity and individuality of answers provided by the children in the current study provide robust support for the appropriateness of qualitative research as an effective approach to explore thinking styles.

Given the novel insights on thinking styles and the individual voice established in this study, there is potential for implications for applied settings such as counselling, guidance in occupational choice and employment (Roodenburg, 2006) as well as educational and clinical settings. With significant implications for educational settings, educators may come to better understand the influence of IDs between children in their classrooms and to appreciate each child for their uniqueness.

Is style something that is constant throughout our life or do our learned experiences influence the manner in which we think? Do our thinking styles change over time as we accrue more information with which to make informed choices and preferences or are they fixed?

Conclusion

The present study opens new avenues for further exploration and conceptualisation of thinking style. It has illustrated that the Ways of Thinking do emerge to various degrees in children, with some showing a greater preference for particular ways of thinking over others. In line with past research, findings support the notion that individuals' thinking styles are made up of a conflation of facets earlier observed by mixed-methods approaches with adults and contribute to understanding how individuals are flexible in their thinking to adapt to different tasks and situations.

By giving the children a voice in their own thinking reflections, this research project will build further on the Ways of Thinking model, with implications to discover more about how we develop, learn and connect with the world around us. Each individual is a unique being, made up of many parts and interconnecting layers of complexity, seen and unseen. Insight into these layers and how they may interact with each other will lead to a better understanding of our individual ways of thinking, feeling and behaving. This understanding into an individual's Ways of Thinking has implications to be used in families, counselling, educational and clinical settings and future ID research.

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Personality, Fear of Missing Out and Facebook Intensity

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Social mediums, such as Facebook, have permanently changed the process of human communication and information seeking, however there are different levels of use ranging use from casual scrollers to keyboard warriors. This study explores the contribution of the Big Five Personality Traits, age, and Fear of Missing Out (FOMO) to Facebook Intensity. While there is a moderate amount of literature surrounding Facebook use, studies mainly focus on university student samples, which are not representative of the Facebook population. Three hundred and forty-eight participants, aged between 18 and 45 years, completed the Multidimensional Facebook Intensity Scale, Mini International Personality Item Pool, and Fear of Missing Out Scale. Results demonstrate low Openness to Experience, high Extraversion, high Agreeableness, high Neuroticism, low age, and high FOMO all significantly contribute to increased Facebook Intensity levels. Regression analysis reveals FOMO makes the largest, unique contribution to Facebook Intensity. Given empirical knowledge of FOMO is still in its infancy, future research should further investigate this phenomenon. Does FOMO's strong influence on SNS use extend beyond Facebook to newer social networking sistes such as Instagram and Snapchat? These findings have implications for potential interventions for problematic social networking use and addiction.

Despite social networking sites (SNS) being a relatively new phenomenon, there are approximately 15 million Australians who possess a Facebook account, making it the most popular SNS in the country and a highly popular activity (Cowling, 2016). Social mediums have permanently changed the process of human communication and information seeking, however there is a vast difference in the intensity of Facebook use between different groups of people, from casual scrollers to keyboard warriors. The current paper explores the role of age, Personality and Fear of Missing Out in Facebook Intensity.

The general term, Facebook Use refers to the frequency and duration Facebook visits, activities and number of Facebook 'friends'. However, Facebook Intensity goes beyond mere use indicating the strength of involvement with Facebook and grasps the extent to which Facebook use is integrated into one's everyday life (Orosz, Tóth-Király, & Bőthe, 2015). Facebook Intensity measures the constant preoccupation and perceived importance in functioning adequately on a daily basis.

Personality

According to, Costa and McCrae's (1992) Big Five Factor Model of Personality, aspects of personalities can be captured by the following five, statistically-derived factors: Openness to Experience (the tendency to seek out new experiences and ideas); Conscientiousness (the preferences for organisation over spontaneity and high self-control); Extraversion (the desire for external stimulation through the company of others); Agreeableness (the extent to which one is focused on maintaining positive social relations);

and Neuroticism (emotional stability and the tendency to experience mood swings and negative emotions; (Bachrach, Kosinski, Graepel, Kohli, & Stillwell, 2012).

Research literature regarding Facebook use and personality is inconsistent in terms of which personality traits contribute to intensity of Facebook use. A study of tertiary students found those scoring high on Openness to Experience reported spending more time on Facebook than low scorers, while Extraversion and Neuroticism appear to have no association with Facebook use (Skues, Williams, & Wise, 2012). Kessler (2013) found higher levels of Agreeableness, Conscientiousness, or Neuroticism were more likely to increase students' Facebook Intensity than higher levels of Extraversion. However, Extraversion was the only personality traits found to increase Facebook Intensity in another university sample (Jenkins-Guarnieri, Wright, & Hudiburgh, 2012). These findings should be interpreted with caution as they cannot be generalised to all age groups due to their focus on young adults.

A study involving an age-diverse sample found those scoring higher on Openness to Experience, Extraversion, and Emotional Stability (e.g. Neuroticism) to be heavier users of social media in general and a negative correlation between age and social media use (Correa, Hinsley, & Gil De Zungia, 2010.) In this study, the Big Five personality traits were found to predict 11% of variance in Facebook use among Young Adults (aged 18-29), but predicted only 4% of variance in Facebook use among Adults (aged over 30; Correa et. al., 2010). Ryan and Xenos (2011) found a positive relationship between Neuroticism and daily duration of Facebook use, and suggested Facebook users were likely to be highly Extraverted while Facebook non-users were likely to be highly Conscientious. O'Hagan (2013) found Young Adults (aged 18-25) displayed higher Facebook Intensity than Adults (aged 26-60), with higher Agreeableness associated with higher levels of Facebook Intensity in the whole sample.

Fear of Missing Out

Fear of Missing Out (FOMO) refers to persistent feelings of anxiety due to the belief others may be having rewarding experiences from which one is absent (Przybylski, Murayama, Dehaan, & Gladwell, 2013). Increased interest in FOMO reflects the ubiquity of SNSs, and the social monitoring it affords. Prior to the development of social media, individuals were unaware of what they missed out on because real-time information about what was happening elsewhere was not readily accessible. Now, individuals can view others' lives in real-time and, theoretically, one is always missing out on something (Miller, 2012). Ryan (2015) suggests FOMO occurs when Facebook is not monitored prompting individuals to engage in repetitive checking of Facebook to relieve the anxiety, thus, reinforcing FOMO. Similarly, a qualitative study found users feared missing out on social information if they refrained from checking Facebook, despite their not knowing what it is they will actually be missing out on (Fox & Moreland, 2015). A recent study found university students who scored high on FOMO engaged in more frequent Facebook use than low FOMO students (Abel, Buff, & Burr, 2016). FOMO has been associated with Internet addiction in adolescents (aged 17-20) with over half of participants displaying both Internet addiction and FOMO,

while 4% exhibited Internet addiction alone (Vaidya, Jaiganesh, & Krishnan, 2015). To date, studies of FOMO have focussed on Young Adults, so their findings should not be widely applied to the population. In relation to age, Przybylski and colleagues' (2013) findings suggest FOMO is likely to decrease as one gets older, however further research is required to support this claim.

The Current Study

The current study investigates the relationship between the Big Five personality traits and FOMO and Facebook Intensity. Knowledge about the contribution of personality and FOMO Facebook Intensity can provide an insight into social media addiction and inform interventions for problematic social networking behaviour. Around 75% of Australian Facebook users are over 25 years old (Ramondo, 2015). Despite this, the current literature regarding Facebook use relies mainly on university samples, limiting the generalisability of findings to the wider Facebook user population. The current study addressed this weakness by examining Facebook use between two age groups: Young Adults (18-29 years) and Adults (30-45 years). Given literature into personality correlates of Facebook use lacks consensus, the current study explored the following research questions:

1. What is the contribution of The Big Five Personality traits to Facebook Intensity?
2. What is the contribution of FOMO to Facebook Intensity?
3. Does Personality and FOMO's relationship with Facebook Intensity differ between Young Adults and Adults?

Method

Participants

The sample consisted of 348 adult participants including 228 females, 109 males, and three non-binary individuals (i.e., gender questioning, non-binary, and two-spirit) with an age range of 18 to 45 years (M = 26.48, SD = 6.92). Based on psychological, medical and social research (Correa et. al., 2010), the sample was split into 236 'Young Adults' (18 – 29 years; M = 22.46, SD = 2.98) and 107 'Adults' (30 – 45 years; M = 35.36, SD = 4.39). There were eight participants who did not provide their gender and five participants who did not provide their age. These participants were included in the analysis of the whole sample, but those who did not provide their age were excluded from the analysis between age groups.

Materials

The 13-item Multidimensional Facebook Intensity Scale (MFIS; Orosz et. al., 2015) was used to assess the intensity of participants' Facebook use. Each item required participants to indicate their level of agreement with a statement (e.g., "When I'm bored, I often go to Facebook") on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). The MFIS demonstrates good reliability within the current study (α = .87).

The 20-item Mini International Personality Item Pool (Mini-IPIP; Donnellan, Oswald, Baird, & Lucas, 2006) was used to measure each of the Big Five Factors of Personality. Items

required a response on a 5-point Likert scale ranging from 1 (’very inaccurate’) to 5 (’very accurate’) indicating the extent stated characteristics (e.g., “Get upset easily”) describe oneself. All five subscales demonstrated good internal consistency within the current study (Openness α = .70; Conscientiousness α = .62; Extraversion α = .81; Agreeableness α = .70; Neuroticism α = .68). While this scale refers to Openness to Experience as Intellect/Imagination, the current paper phrases this scale as Openness to Experience for ease of comparison with the Big Five literature.

The 10-item Fear of Missing Out Scale (FOMOs; Przybylski et. al., 2013) was used to measure the participants’ experiences of FOMO. Participants indicate the extent to which each scale item (e.g., “I fear others have more rewarding experiences than me”) reflects their general experience on a 5-point Likert scale from 1 (’not at all true of me’) to 5 (’extremely true of me’). The FOMOs possessed good internal consistency within the current study (α = .87).

Procedure

After obtaining approval from the RMIT University Human Research Ethics Committee, participants were recruited via advertisements shared on Facebook. The advertisement briefly outlined the study, inclusion criteria (aged 18 years or over and possess a Facebook account), and provided a link to the study’s Facebook page from where participants could access the online questionnaire. The questionnaire was completed voluntarily, at a time convenient for participants and took approximately ten minutes to complete.

Results

Descriptive statistics

Initial analysis revealed the Adult group displayed lower mean scores Open to Experience and higher mean scores on Conscientiousness compared to the Young Adult group. Young Adults had higher mean Facebook Intensity and FOMO scores compared to Adults (see Table 1).

Table 1

*Descriptive Statistics for Personality Traits, Facebook Intensity and FOMO scores in the full sample (*N *= 348), Young Adult (*n *= 236) and Adult (*n *= 107) groups.*

	Sample	**Young Adults**	**Adults**
	M (SD)	*M (SD)*	*M (SD)*
Openness	15.02 (3.17)	15.18 (3.16)	14.68 (3.22)
Conscientiousness	13.61 (3.20)	13.34 (3.25)	14.28 (3.03)
Extraversion	11.86 (3.89)	11.95 (3.87)	11.65 (3.96)
Agreeableness	15.91 (2.88)	15.94 (2.86)	15.83 (2.93)
Neuroticism	12.60 (3.32)	12.47 (3.33)	12.86 (3.33)
Facebook Intensity	2.76 (0.74)	2.81 (0.73)	2.61 (0.75)
Age	26.48 (6.92)	22.46 (2.98)	35.36 (4.39)
FOMO	2.40 (0.83)	2.51 (0.83)	2.14 (0.76)

Note. Openness = Openness to Experience. FOMO = Fear of Missing Out.

Personality and Facebook Intensity

A correlational analysis was conducted to examine the relationships between all five personality traits and Facebook Intensity in the full sample. Openness to Experience, Extraversion, Agreeableness, and Neuroticism all significantly correlated with Facebook Intensity (see Table 2). A multiple regression analysis was conducted to evaluate the extent to which these four personality traits predict Facebook Intensity. The model predicted 14% of the variance in Facebook intensity scores, $R^2 = .14$, $F(4, 342) = 13.56$, $p < .001$. All four traits contributed uniquely to the model with Openness to Experience being a negative predictor of Facebook Intensity (see Table 3).

Table 2

Correlations relating to Facebook Intensity

	Facebook Intensity		
	All	Young Adults	Adults
Openness	-.22***	-.27***	-.16
Conscientiousness	-.02	.02	-.04
Extraversion	.16**	.15*	.16
Agreeableness	.19***	.22**	.14
Neuroticism	.12*	.07	.25*
Age	-.16**	-.10	-.12
FOMO	.47***	.45***	.47***

Note. Openness = Openness to Experience. FOMO = Fear of Missing Out.

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

Table 3

*Multiple Regression Summary for Personality and Facebook Intensity in the full sample (*N *= 348)*

Predictor	*B*	*SE B*	β
Openness	-.06	.30	-.27***
Extraversion	.03	.01	.17**
Agreeableness	.05	.01	.19***
Neuroticism	.03	.01	.14**

Note. Openness = Openness to Experience.

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

Correlational analyses were conducted between personality traits and Facebook Intensity in the Young Adult and Adult groups. Results show Openness to Experience, Extraversion, and Agreeableness all significantly correlate with Young Adults' Facebook Intensity (Table 2). A multiple regression analysis was conducted with these traits to predict Facebook Intensity in Young Adults. The model significantly predicted 15% of the variance in Facebook Intensity, $R^2 = .15$, $F(3, 232) = 13.79$, $p < .001$, with all three traits contributing uniquely significantly to the model (see Table 4).

Table 4

*Multiple Regression Summary for Personality and Facebook Intensity in Young Adults (*n *= 236)*

Predictor	*B*	*SE B*	β
Openness	-.07	.01	-.30***
Extraversion	.02	.01	.12*
Agreeableness	.06	.02	.23***

Note. Openness = Openness to Experience.

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

In the Adult group, the only personality trait to significantly relate to Adult Facebook Intensity was Neuroticism (see Table 2). A multiple regression analysis demonstrates that Neuroticism significantly predicts 6% of the variance in Adults' Facebook Intensity, $R^2 = .06$, $F(1, 104) = 6.78$, β = .25, $p = .011$.

Personality, Age, FOMO and Facebook Intensity

Correlational analysis was conducted to examine the relationships between age and FOMO and Facebook Intensity in the full sample. There was a negative, significant relationship between age and Facebook Intensity, and a positive, significant relationship between FOMO and Facebook Intensity (see Table 2). A multiple regression analysis was conducted with the full sample to examine a predictive model comprising Openness to Experience, Extraversion, Agreeableness, Neuroticism, age, and FOMO on Facebook Intensity. The model significantly explained 30% of the variance in Facebook Intensity, $R^2 = .30$, $F(6, 333) = 23.22$, $p < .001$, with Openness to Experience, Extraversion, Agreeableness, and FOMO all contributing uniquely to the model (see Table 5).

Table 5
*Multiple Regression Summary for Facebook Intensity in the full sample (*N *= 348)*

Predictor	*B*	*SE B*	β
Openness	-.05	.01	-.20***
Extraversion	.03	.01	.15**
Agreeableness	.04	.01	.15**
Neuroticism	.01	.01	.02
Age	-.01	.01	-.05
FOMO	.36	.04	.40***

Note. Openness = Openness to Experience. FOMO = Fear of Missing Out.
*** $p < .001$. ** $p < .01$. *p < .05

Personality, Age, FOMO and Facebook Intensity across age groups

The relationship between FOMO and Facebook intensity was further investigated in the Young Adult and Adult groups. A correlational analysis demonstrated no relationship between age and Facebook Intensity in either age group. There was a significant relationship between FOMO and Facebook Intensity in Young Adults and Adults (see Table 2).

A multiple regression analysis was conducted to evaluate a predictive model of Facebook Intensity in Young Adults including Openness to Experience, Extraversion, Agreeableness and FOMO as predictors. The model explained 29% of variance in Young Adults' Facebook Intensity, $R^2 = .29$, $F(4, 230) = 23.44$, $p < .001$, with all predictors contributing uniquely to the model (see Table 6).

Table 6
*Multiple Regression Summary for Facebook Intensity in Young Adults (*n *= 236)*

Predictor	*B*	*SE B*	β
Openness	-.05	.01	-.22**
Extraversion	.02	.01	.12*
Agreeableness	.04	.02	.18**
FOMO	.34	.05	.39***

Note. Openness = Openness to Experience. FOMO = Fear of Missing Out.
*** $p < .001$. ** $p < .01$. *p < .05

A multiple regression analysis was then conducted to evaluate a predictive model of Facebook Intensity in Adults including Neuroticism and FOMO as predictors. The model explained 22% of the variance in Adults' Facebook Intensity, $R^2 = .22$, $F(2, 102) = 14.56$, $p <$

.001. FOMO made a significant unique contribution to the model, β = .44, $p < .001$, but Neuroticism did not, β = .08, $p = .406$.

Discussion

The aim of the study was to examine the extent to which the Big Five Personality Traits and FOMO predict Facebook Intensity in adults. The first research question concerned the contribution of personality traits to Facebook Intensity. Together, Openness to Experience, Extraversion, Agreeableness and Neuroticism significantly predicted 14% of variance in Facebook Intensity, with Openness to Experience making the largest, and only negative, contribution. This is inconsistent with previous research that found no relationship between Facebook use and Openness (Jenkins-Guarnieri et. al., 2012; Kessler et. al., 2013; O'Hagan, 2013; Skues et. al., 2012). Facebook can be considered a fairly 'old' SNS since the recent development and rising popularity of other social media platforms. Therefore, those Open to Experience may not be high Facebook users due to their possible preoccupation with novel SNSs to satisfy their curiosity needs. People low on Openness may not use these other mediums as much because they are comfortable and familiar with Facebook. Unsurprisingly (Correa et. al., 2010; Pettijohn et. al., 2012), age was found to have a significant, negative relationship with Facebook Intensity. Older individuals may be more comfortable with a SNS-free lifestyle than younger individuals who have spent majority of their life exposed to social mediums and may consider it as part of daily routine as opposed to just a leisure activity.

The second research question concerned the contribution of FOMO to Facebook Intensity. Supporting past research (Abel et. al., 2016; Fox & Moreland, 2015; Przybylski et. al., 2013; Ryan, 2015), the study found FOMO shares a positive, significant correlation with Facebook Intensity, and that as FOMO levels increase, so too does Facebook Intensity. High FOMO individuals may be highly engaged in Facebook as a means to alleviate their anxiety about not knowing because in a matter of minutes, they can be completely caught up with everything happening around them thanks to a single Facebook visit. On the other hand, those who experience low FOMO are not concerned if they are unaware of specific pieces of information and therefore may perceive Facebook as pointless and thus disengage with it, which supports Fox and Moreland's (2015) qualitative study. A regression model comprising Openness, Extraversion, Agreeableness, Neuroticism, age and FOMO explains 30% of variance in Facebook Intensity, which is double than the predictive model of personality alone.

The final research question focussed on whether the predictive relationship of Personality, age and FOMO on Facebook Intensity varied between Young Adults and Adults. In Young Adults, Openness to Experience, Extraversion, Agreeableness and FOMO significantly explain 29% of variance in Facebook Intensity, which is similar to the predictive model of Facebook Intensity for the full sample. Young Adults make up 75% of the full sample in the study, so this results is unsurprising. Neuroticism and FOMO significantly explain 22% of Facebook Intensity variance in Adults, however Neuroticism does not

uniquely contribute to the model. This is likely because of the overlap between the constructs FOMO and Neuroticism.

When comparing age groups, the influence of FOMO on Facebook Intensity remains unchanged, suggesting FOMO is present throughout the lifespan and affects Facebook use across different ages. This is not to say that the two age groups fear missing out on the same things. For example, Young Adults may be concerned with staying up to date with the activities among their offline friendship networks, while Adults may be more concerned with the happenings of their immediate and extended family members.

The present study features limitations that should be acknowledged and considered in future research. Although the study recruited a broad age-range, the sample has a positively skewed age distribution. While 75% of all Facebook users are over 25 years, in the present sample, only 40% of participants were aged over 25 years. Future research should endeavour to obtain a sample distributed in a similar way to which the Facebook population is in terms of age and should consider participants between 13 and 17 years, which was not included in the present study.

Future research should consider investigating newer and increasingly popular SNSs such as Instagram and Snapchat to observe whether present findings are consistent across different types of SNSs or unique to Facebook. FOMO appears to be a strong basis for explaining social networking behaviour and is more influential on Facebook use than personality, thus, it warrants further investigation.

In conclusion, Openness to Experience, Extraversion, Agreeableness and Neuroticism are the personality traits associated with Facebook Intensity. However, FOMO plays a much more influential role and warrants further exploration. Investigating the role of psychological factors into social media use enables increased understanding of the development of problematic SNS use and poses potential implications for marketing on SNS in terms of targeting specific audiences that frequently access the site.

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