PILOTING A SCALE OF SOCIAL INTEGRATION IN SOUTH AFRICAN ORGANISATIONS

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Compulsory Declaration:

This work has not been previously submitted in whole, or in part, for the award of any degree in this or any other university. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed, and has been cited and referenced.

Signature: Signed by candidate *Date:* 2 February 2019

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ABSTRACT

"Social integration" is a construct referred to in workgroup and organisational research, in particular in research focused on understanding workplace diversity. The present research examined how the *social integration* construct could be more clearly conceptualised and measured in the South African context. Guided by Hinkin's (1998) scale development framework, the research seeks to contribute to the early stages of the development of a scale of *social integration*, suited for use in South African workplaces. Items were generated theoretically, leading to a final pool of 72 items. 620 usable responses were received from individuals employed in organisations in South Africa and this sample was randomly split into two samples of 310 participants each: a "calibration" and "validation" sample. On the calibration sample, exploratory factor analysis (EFA) was conducted in order to examine emerging first- and higher-order latent variable structures. EFA led to the development of a first-order, seven-factor model. Exploratory extension analysis generated three possible higher-order latent variable structures. Using confirmatory factor analysis (CFA), both the first- and higher-order models were fitted to the "validation" sample to test if the models generalised to a second sample drawn from the same population. Results indicated that the first-order model demonstrated an adequate fit, as well as two of the three higher-order models. The fit of these two higher-order models did not differ significantly. Post-hoc analyses determined that, while *social integration* can be considered a meaningful higher-order construct, the construct has theoretical rather than practical relevance for researchers. Responses to the proposed scale of *social integration* should be interpreted at the level of the identified first-order constructs rather than as a single scale representing the higher order, abstract *social integration* construct. The generalisability and contextual nature of the research findings, suggestions for future research, and the theoretical and practical limitations of the present research are discussed.

Key words: social integration; workplace diversity; group attachment; group identification; affective commitment; group cohesion; satisfaction with co-workers; behavioural integration; quality of social relations; group inclusion; psychological empowerment.

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A BRIEF NOTE ON TERMS AND FORMATTING

I used R throughout and found that the packages and functions were either named in a different font or written out in an impractically long manner. In most cases I opted not to do this and, for example, a reference to the "fa" function in the "psych" package for R appears simply as *psych::fa*.

Where symbols referred to matrices, they were capitalised and bolded, for example, **R** (sample correlation matrix). American Psychological Association (APA) manuscript formatting guidelines (American Psychological Association, 2013) were largely adhered to, with some exceptions. For example, 1.5 line spacing was used instead of 2.0, some space was included between paragraphs, (minimal) footnotes have been included, and font size in large tables was reduced to 10pt to improve readability. The names of constructs, when they appear in relevant peer-reviewed literature as measured variables, have at times been italicised to differentiate them from terms, ideas, abstract concepts and perceived experiences.

CHAPTER ONE: INTRODUCTION

"Social integration" is a construct referred to in workgroup and organisational research, in particular in research focused on understanding workplace diversity. As Harrison and Klein demonstrated in their 2007 article, various constructs used in workplace diversity research have been inconsistently conceptualised and measured. In reference to Harrison and Klein's (2007) analysis, this thesis proposes that the social integration construct requires a comprehensive and consistent conceptualisation and measurement. Based on a review of various definitions of social integration in the workplace, the proposed research sought to develop a comprehensive scale to measure the social integration of employees within the South African organisational context in order to improve the content and construct validity of the social integration construct, as well as the internal validity of any research that builds on it. Such a tool could also contribute towards a better understanding of workplace social integration in practice, enabling leaders and organisations to refine approaches to the pursuit of social integration.

1.1. Introduction to Social Integration

The term social integration first appeared in 1897, in the seminal writings of sociologist Emile Durkheim on suicide (Berkman, Glass, Brissette, & Seeman, 2000). Durkheim's focus was on developing theory that positioned individual pathologies as a function of social dynamics (Berkman, et al., 2000). The term has subsequently been applied in multiple areas of enquiry, for example, community psychology (Felton & Shinn, 1992), psychiatry (Dickey & Ware, 2015), disabilities (Eliason, 1998; Parent, Kregel, Metzler, & Twardzik, 1992), public health (Hoel, Eriksen, Breidablik, & Meland, 2004), nursing (McCloskey, 1990), education (Rubin, 2012), and politics (Lukes, 1975).

The United Nations Department of Economic and Social Affairs (UNDESA) currently provides a working definition of social integration as characterised by inclusion, unity, collaboration and cohesion, and not involving coercion or assimilation (UNDESA, 2017). From a sociological perspective, Blau (1960) stressed that social integration includes attraction between individuals, generating the social bonds and cohesive structures that differentiate a group from a random collection of individuals.

1.2. The Organisational Setting

Three coherent streams of research utilising *social integration* as a construct and measurable variable have been identified in the organisational psychology literature. These streams of research do not appear to have cross-pollinated, although they are conceptually similar. As is the difficulty in all behavioural sciences where variables have been generated as a means to quantify experiences, concepts or phenomena (Blumer, 1956), there also exist neighbouring constructs which appear conceptually similar, for example, *team integration* (e.g. Lichtenstein, Alexander, Jinnett, & Ullman, 1997). The three research streams in the quantitative organisational psychology literature in which the term *social integration* is used are briefly summarised below, and the particular stream of research drawn on in the present research delineated.

1.2.1. Social integration as newcomer adjustment. In literature focused on the entry of new individuals into organisations or workgroups, and the extent to which newcomers are able to adjust, socialize and form relationships in their new surroundings, *social integration* is described as a "process of developing relationships" (Chan & Schmitt, 2000; Morrison, 1993, p. 174). Sometimes called *workgroup integration* (e.g. Kowtha, 2008), attachment to organisations, the degree to which individuals feel accepted by members of their workgroup, and the self-evaluation of individual social behavior within the organisation are frequently referenced as newcomers adjust to new work roles (Kammeyer-Mueller, Wanberg, Rubenstein, & Song, 2013; Menguc, Han, & Auh, 2007; Morrison, 1993; 2002; Nagele & Neuenschwander, 2016; Saks, Gruman, & Cooper-Thomas, 2011; Waldeck, Seibold, & Flanagin, 2004; Zhang, Liao, Yan, & Guo, 2014; Zou, Tian, & Liu, 2015).

1.2.2. Social integration as perceived social support. *Social integration* is conceptualised by Weiss (1974, in Cummings, 1989) as a facet of *perceived social support*; one of six "relational provisions" (p. 777). In organisational literature focused largely on the study of the workplace dynamics of nurses, *social integration* has been conceptualised as "the positive affective relationship with coworkers" (Bellinger & McCloskey, 1992, p. 322) or the degree to which employees perceive their relationships with coworkers to be supportive. The construct appears at times as *group cohesion* or *social support* in this body of literature (that is, *social support* might be measured with a *social integration* scale) (Abu Al-Rub, 2004; 2006; Amarneh, Abu Al-Rub, & Abu Al-Rub, 2010; Baker, O'Brien, & Salabuddin, 2007; Jafari, Sadeghi, Maghadam, Shojaci, & Ebrahimpoor, 2016; McCloskey, 1990; Rezaee, & Ghajeh, 2009).

1.2.3. Social integration as psychological connection. It is in the diversity literature that *social integration* is described as a more complex higher-order or nested construct, subsuming several first-order factors. In literature focused on group demography, diversity, and the functioning of groups, *social integration* in workplaces is described as a positive psychological link between individual and group, characterised by experiences such as cohesion, morale, group identification, interpersonal attraction and satisfaction with co-workers (Knight & Eisenkraft, 2015; O'Reilly, Caldwell, & Barnett, 1989; Smith, et al., 1994). The content and structure of *social integration* as it exists in this stream of research will be more fully explored in a review of the available peer-reviewed literature in Chapter Two. This stream of literature was chosen both for its contextual relevance to the South African organisational setting, as explored in Section 1.3. below, and because inconsistencies in the conceptualisation and measurement of the construct invite further research.

1.3. The South African Context

Research in the field of social integration has particular relevance in South Africa, as the social and economic integration of South Africa's different population groups, or lack thereof, is widely regarded as a social problem that needs to be addressed (Struwig, et al., 2013). Social disintegration and alienation have been linked to violence and social segregation, and are closely aligned with economic inequality and barriers to participation (Hall, 2016; Smith, 2012; Struwig, et al., 2013). Appearing regularly in the press, terms like integration, transformation, social cohesion and empowerment are used interchangeably to describe the process of overcoming group-based divisions and inequalities in a diverse population (Allison, 2015; Cronje, 2015; Fairbanks, 2014; Fisher, 2016; Spector, 2014). One of the ways in which South Africa has sought to improve integration has been by directing the hiring and promotion practices of organisations through employment equity legislation (Department of Labour, 2015). While this approach monitors progress in the demographic makeup of organisations' workforces by the measurement of objective indicators (in the form of population quotas, e.g. race/gender statistics), it does not consider what individuals' subjective experience of a demographically and socially integrated workplace might be. This sentiment was highlighted in the 2015/16 Commission for Employment Equity (CEE) report (Department of Labour, 2015):

> "I am excited to share that the Commission's strategic plan for the period 2016 to 2021 has prioritised the need to go beyond workforce demographic statistics and move

> towards a better understanding of the experience of fair treatment, diversity and "inclusion" Management." Tabea Kabinde (CEE Chairperson, 2015/16) (p. vii)

This statement from the CEE reflects an international trend away from diversity management and towards the cultivation of inclusive organisational climates (e.g. Mor Barak 2015; Nishii, 2013). Thus, an exploration of individuals' perceptions of *social integration* at their places of work may yield new insight regarding how to best monitor and manage this process in South African organisations. The development of a scale (i.e. indicators) of *social integration* in the South African organisational context has the potential to add value to organisational psychology research and practice by refining the concept and improving efforts to monitor and understand levels of *social integration* in the workplace.

1.4. The Research Question

The present research seeks to answer the following question: *How can employee social integration in South Africa be more clearly conceptualised and measured?*

This question is explored as follows: In Chapter Two the existing literature, broadly delineated in Chapter One, is reviewed in order to gain a comprehensive overview of the research stream within which the present study is situated. Chapter Three describes the research design, process and methods employed to explore the research question. Chapter Four describes the analyses performed in pursuit of the research question, and presents the results of those analyses. Finally, results are discussed and contextualised in Chapter Five.

CHAPTER TWO: LITERATURE REVIEW

In this chapter, a comprehensive review of the content and structure of *social integration* in the workplace is conducted, as it exists in the stream of literature broadly delineated in Chapter One, which conceptualises workplace *social integration* as psychological connection. The content domain of *social integration* is identified and discussed, as well as relevant process-based theories. The chapter concludes with a review of the existing psychometric evidence base for the content and construct validity of existing measures of *social integration*.

2.1. Social Integration: A Definition

O'Reilly, Caldwell, and Barnett (1989) assert that "social integration, or the degree to which an individual is psychologically linked to others in a group, is a multifaceted phenomenon" (p. 22). This suggests that psychological connections exist which link the individual to the group, that they vary by degree, and that they are multifaceted. This definition is similar to earlier thinking in sociology, for example, Blau (1960) posited that social integration prevailed "in a group if bonds of attraction unite its members" (p. 545). Two broad approaches to the comprehension of these individual-group psychological connections are evident in the workplace diversity literature:

1. Descriptions of the content or manifestation of individual-group psychological connections (see Section 2.2. and Appendix A for examples).
2. Descriptions of the processes by which individual-group psychological connections arise, are maintained and/or change (see Section 2.3.).

Process theory is frequently used to explain relationships between *social integration*, antecedents, and individual or organisational outcomes, such as measures of relational demography, group affect, task performance, contextual performance, return on investment, and turnover (Guillaume, et al., 2012; Knight & Eisenkraft, 2015; O'Reilly, et al., 1989; Smith, et al., 1994). For example, Social Identity Theory (SIT) (Tajfel, 1979; Turner & Reynolds, 2010) and Self-Categorisation Theory (SCT) (Hogg & Terry, 2000) have been used to inform an understanding of the relationship between various forms of relational demography (e.g. surface-level and deep-level dissimilarity) and *social integration* (or components thereof) (Guillaume, et al., 2012; Van Dick, Wagner, Stellmacher, & Christ, 2004). *Social integration* has also been positioned in workplace diversity research as an

intervening process between forms of diversity and organisational outcomes (Guillaume, et al., 2012; O'Reilly, et al., 1989; Smith, et al., 1994).

While *social integration* is positioned as a group process itself in the research above, and is influenced by multiple factors, *social integration* is theorised to develop primarily because of the forces of attraction (and other affective factors) experienced by individuals towards other individuals and groups (Blau, 1960; Katz & Kahn, 1978). Blau's (1960) Theory of Social Integration posits that attraction leads to the bonds and cohesion typical of integrated groups. Bonds of social attraction can be analysed from two vantages: (1) the attraction an individual feels towards a group; and (2) how attractive an individual is to the group. Neither force of attraction is enough alone to make a person an integrated member of a group. Similarly, Self-Categorisation Theory (SCT) describes *social integration* as a balance between forces of social and interpersonal attraction (Hogg & Terry, 2000). Process theories thus explain why and how *social integration* occurs, but they can inform the "what", too, i.e. the conceptualisation of the construct of *social integration* itself. In the following section, existing research focusing on the content domain of *social integration* is first introduced, followed by an interrogation of this content through the lenses of selected process theories.

2.2. Social Integration: The Content Domain

Existing literature on the content domain of *social integration* in the workplace identifies, broadly, five component parts, described in the sections below.

2.2.1. Group attachment. Attraction to workgroups has been described as an aspect of *social integration* by various researchers (Harrison, Price, Gavin, & Florey, 2002; O'Reilly, et al., 1989; Rico, Molleman, Sanchez-Manzanares, & Van der Vegt, 2007) as well as in meta-analyses (Guillaume, et al., 2012; Knight & Eisenkraft, 2015; Stahl, Maznevski, Voigt, & Jonsen, 2010). Guillaume, et al. (2012) describe *group attachment* as an umbrella term, comprised of *affective commitment* and *group identification*, which constitute a "psychological bond between employee and employer" (Riketta & Van Dick, 2005, p. 491). The concept of *group identification* has been variously defined as "the positive emotional valuation of the relationship between self and ingroup" (Postmes, Haslam, & Jans, 2013, p. 599), "the perception of oneness with or belongingness to" a group (Ashforth & Mael, 1989, p. 21), and a "partial answer to the question, Who am I?" (Ashforth & Mael, 1989, p. 21). Edwards and Peccei (2007) describe *group identification* as "a psychological linkage" (p. 30). Similarly, *affective commitment* refers to the levels of identification, involvement and

attachment individual employees feel toward an organisation or group (Allen & Meyer, 1990). In a meta-analysis conducted by Riketta and Van Dick (2005), *identification* and *affective commitment* were demonstrated to be closely related, but distinct constructs. This finding may lend credence to Van Dick, Wagner, Stellmacher, and Christ's (2004, p. 185) argument that *commitment* and *identification* are distinguishable as constructs on the basis that "commitment research largely ignores the affective, evaluative and cognitive perception of being an organizational member" that is associated with individuals experiencing a sense of "oneness" with groups (Edwards, 2005; Edwards & Peccei, 2007).

2.2.2. Group cohesion. *Group cohesion* (or *team*/*workgroup cohesion*) is described by Harrison, Price and Bell (1998) as the primary affective dimension of *social integration*. The construct has been included in some of the most widely cited organisational workgroup diversity studies that deal with *social integration*, for example, O'Reilly, Caldwell, and Barnett (1989), Harrison et al. (2002) and Smith, et al. (1994). However, the *group cohesion* construct has not been included in every conceptualisation of *social integration*, for example, Guillaume, et al. (2012) do not refer to it. The term *group cohesion* is derived from the metaphor of a group sticking together (Harrison, et al., 1998). Conceptualisations vary, for example, Horowitz and Horowitz (2007) define *group cohesion* as "the extent to which team members attempt to remain intact to achieve team goals" (p. 995). Morrison (2008) describes *group cohesion* as reflecting a "general liking of one's co-workers, as well as perceptions that an employee shares a great deal of common ground with his/her colleagues" (p. 334), identifying three characteristics of *group cohesion*: (1) social support, (2) workload sharing, and (3) communication and cooperation amongst colleagues. Li, Early, Mahrer, Klaristendeld, and Gold (2014) conceptualise *group cohesion* as "the extent to which interpersonal relations … promote productivity, efficiency, morale, belongingness, positive personal feelings about the group, and enjoyment of working together" (p. 93). Through a review of the then existent literature, Bollen and Hoyle (1990) developed a more specific conceptualisation of individual group members' perceptions of *group cohesion*, proposing that the construct itself contains two conceptual dimensions: a *sense of belonging* and *feelings of morale*. For the purposes of the present research, Bollen and Hoyle's (1990) conceptualisation is considered to represent perceived *group cohesion*, and was chosen for the strength of its theoretical foundation. For example, their review of *group cohesion* theory covers existing measures that have been employed in the measurement of *social integration*, such as the Seashore (1954; 1979) measure of *group cohesion*.

2.2.3. Satisfaction with co-workers. *Satisfaction with co-workers* is described repeatedly as a facet of *social integration* (Harrison, et al., 2002; Horowitz & Horowitz, 2007; O'Reilly, et al., 1989). This component has sometimes been extended to include an individual's satisfaction "with peers and job" (Guillaume, et al., 2012, p. 84) or the group performance in general (Stahl, et al., 2010). There are examples where *satisfaction with co-workers* has not been included as a part of *social integration.* For example, Stahl, et al. (2010), in a meta-analysis, separated *satisfaction with group members* from *social integration*, although further detail as to why this decision was taken was not reported.

2.2.4. Behavioural integration. *Behavioural integration*, itself described as a "meta-construct", refers to individual perceptions of collaborative behaviour, information exchange and joint decision making experienced in workgroups (Hambrick, 1994; van der Vegt, 2002; 2010). This dimension is sometimes included in the definition of *social integration*. For example, Harrison, et al. (1998), drawing on O'Reilly, et al.'s (1989) earlier definition describe *social integration* as "the degree to which group members are psychologically linked or attracted toward interacting with one another in pursuit of a common objective" (p. 96, see also, Newell, Maruping, Riemenschneider, & Robert, 2008). Collaboration, cooperation, and prosocial behaviour have all been included as components of *social integration* in meta-analyses (Knight & Eisenkraft, 2015; Stahl, et al., 2010). As has been noted previously, different sources include different components in the *social integration* construct. For example, Li and Hambrick (2005) make a distinction between *behavioural integration* and *social integration,* on the basis that *social integration* emphasises individuals' sense of cohesiveness, whereas *behavioural integration* emphasises forms of collective behaviour. Similarly, Harrison, et al., (2002) operationalised and analysed *collaboration* separately from *social integration*.

2.2.5. Quality of social relations. Whereas descriptions of *behavioural integration* focus on collaborative, goal-directed group behaviour, the *quality of social relations* in a group describes individuals' perceptions of interactions amongst co-workers more broadly (Guillaume, et al., 2012; O'Reilly, et al.,1989; Stahl, et al, 2010). For example, Guillaume, et al. (2012) describe *quality of social relations* as subsuming an individual's "perceptions of relationship conflict experienced when interacting with other group members, the amount of social support received from these peers, and the extent to which individuals perceive themselves included in a work group" (p. 84). Perceptions of trust and morale also feature in descriptions of *social integration* and could be considered under this broad description

(Knight & Eisenkraft, 2015; Stahl, et al., 2010). Whereas Guillaume, et al. (2012) considered levels of *group conflict* as a part of *social integration*, Stahl et al. (2010) separated *group conflict* (task, relationship and/or process) as well as *communication effectiveness* from *social integration*, although they did not elaborate on this interpretation of the construct. Descriptions of individuals' perceptions of interactions with co-workers have also extended beyond the boundaries of the workplace and working relationships to include personal relationships and non-work social interaction. For example, O'Reilly, et al. (1989) measured how many times employees had socialised with colleagues off the job within a month as an operationalisation of "social interaction among group members" (p. 22). Lin and Shih (2008) operationalised the same phrase with descriptions of the sharing of personal resources, good personal relationships and social interaction amongst workgroup members outside of work.

The existing content domain of *social integration* thus identifies five broad component parts, theorised to reflect facets of an individual's perception of the psychological connection that may form between individual group members and the group as a whole.

2.3. Social Integration as a Process

The existing content domain of *social integration*, as identified above, is analysed through the lenses of five group-based process theories which were identified as significant theoretical contributions to an understanding of the construct in a diversity research-based context: Blau's (1960) Theory of Social Integration, Social Identity Theory (Tajfel, 1979; Turner & Reynolds, 2010), Self-Categorisation Theory (Hogg & Terry, 2000), Inclusion Theory (Jansen, Otten, van der Zee, & Jans, 2014) and the Needs-Based Model of Reconciliation (Shnabel & Nadler, 2008). The use of multiple theories facilitates a more textured analysis, as each theory offers a somewhat different emphasis or perspective. The relevance of each theory to the research question will be discussed in the sections to follow.

2.3.1. Blau's Theory of Social Integration. Blau's (1960) Theory of Social Integration focuses on the forces that generate *social integration*, as characterised by social bonds and cohesive social structures. Individuals are attracted to other individuals or groups and form social bonds with the group as a result (Blau, 1960; Festinger, 1950). Blau (1960) stresses that in order to become an integrated member of a group, it is not enough for an individual to be attracted to a group; an individual can only become an integrated group member if the group also finds that individual attractive, valuing their membership. Conversely, a group may find an individual attractive (e.g. on the basis of their high social

status) but for *social integration* to develop, that attraction must be mutual. Thus, greater mutual attraction between individual and group leads to higher levels of *social integration.*

2.3.2. Social Identity Theory. A theoretical development of the 1970s, Social Identity Theory (SIT) contributes a rich conceptual framework in which the self-construction of identity is understood to be a function of the intergroup context within which an individual is situated (Tajfel, 1974; Tajfel, 1979; Turner & Reynolds, 2010). A social group can be defined as two or more individuals who identify as part of the same social category (Hogg & Abrams, 1988). In an effort to preserve self-esteem and mitigate uncertainty, individuals are motivated to identify with social groups (Hogg & Terry, 2000). The extent to which an individual identifies with a social category (social identification) is a subjective psychological process rather than an objective assessment of a social group's characteristics (Hogg & Abrams, 1988). An individual's self-concept may be comprised simultaneously of multiple social identities on an individual-intergroup continuum, with different social identities becoming salient for individuals at particular times, depending on the contexts in which individuals find themselves (Hogg & Abrams, 1988). Social identification within the context of workgroups leads to the manifestation of *group identification*, as described in Section 2.2.1. Thus, an employee's *group identification* will develop if identification with co-workers boosts self-esteem or reduces uncertainty, if the workgroup is a meaningful social category to the individual, and if the workgroup is a salient identity when the individual interacts with members of the workgroup.

2.3.3. Self-Categorisation Theory. A theoretical development that followed the assumptions of SIT, Self-Categorisation Theory (SCT) addresses individual processes not adequately explained by the intergroup focus of SIT (Turner & Reynolds, 2010). For example, SCT describes in detail the cognitive mechanisms that produce social identity phenomena such as social identification. SCT addresses cohesion within groups by means of the social attraction hypothesis, which posits that "social attraction may foster organizational cohesion, and thereby identification ... conversely, interpersonal attraction may fragment the organization and disrupt identification" (Hogg & Terry, 2000, p. 126). Thus, SCT contributes an understanding of the dynamic between social identification and interpersonal attraction. Interpersonal attraction may be present in a workgroup, but not social attraction (leading to social identification) and the associated adherence to group norms (Hogg & Terry, 2000). Blau (1960) described the attraction an individual feels towards a group (Section 2.3.1.), but did not differentiate between social and interpersonal attraction in the way that SCT does.

2.3.4. Inclusion Theory. Inclusion Theory has been positioned in contrast to that of social identification (Jansen, Otten, van der Zee, & Jans, 2014). Whereas in SIT and SCT the individual is positioned as having agency when identifying with a social group, Inclusion Theory assumes that the group itself has the agency to accept or reject the individual (Jansen, et al., 2014; Shore, Randel, Chung, Erhart, & Singh, 2011). Thus, the level of *perceived group inclusion* experienced by the individual reflects this subjective process.

Inclusion Theory has roots in both Optimal Distinctiveness Theory (ODT; Brewer, 1991) and Self-Determination Theory (SDT; Deci & Ryan, 2000). ODT emphasises the fundamental human need for *belonging*, contrasted by the competing need to experience one's *uniqueness* as a distinct individual. *Belonging* is in turn conceptualised by ODT as subsuming perceptions of *group membership* (i.e. the perception that there is a bond between individual and group) and *group affection* (i.e. the perceived value of that bond to the group). In a subsequent theoretical iteration, the ideas of ODT were aligned with SDT, which highlights three fundamental psychological needs which experiences in the group context have the potential to satisfy: *competence*, *autonomy* and *relatedness* (Deci & Ryan, 2000; Jansen, et al., 2014; Shore, et al., 2011). The innate need to experience *relatedness* was aligned with the need to experience *belonging*, as described by ODT. While the need for *autonomy* can be viewed as task-related autonomy (similar to the conceptualisation of *perceived control* discussed in Section 2.3.5.) this dimension of SDT was viewed by the authors through the lens of identity ("Am I able to be myself?") and related to ODT's *uniqueness* dimension (Jansen, et al., 2014; Shore, et al., 2011).

In this theoretical development, the need for *uniqueness* or identity-related *autonomy* was re-conceptualised as *perceived authenticity* (Jansen, et al., 2014; Shore, et al., 2011). Whereas *uniqueness* emphasises those group members who may not be prototypical of the group, *authenticity* includes both minority or majority members. Inclusion Theory thus emphasises that *perceived group inclusion* does not imply that an individual assimilates to gain group acceptance, but that individuals' authentic selves are embraced and valued (Jansen, et al., 2014). Groups that value individuality and diversity amongst members may be less susceptible to phenomena such as "groupthink", the detrimental tendency of group members to think alike when engaged in group decision-making, i.e. if diverse perspectives are valued then individuals may feel less pressure to seek "premature concurrence" (Stahl, et al., 2010, p. 3). While this can be viewed as a process gain, diverse groups are also more susceptible to process losses such as interpersonal conflict (Janis, 1972; Stahl, et al., 2010).

Thus, in the present theoretical iteration, *perceived group inclusion* is conceptualised as consisting of two major dimensions: *belonging* and *authenticity. Belonging* is comprised of *group membership* and *group affection*, as described by ODT. *Perceived authenticity* is comprised of *room for authenticity* (i.e. the extent to which an individual perceives that the group allows or tolerates him/her to be his/her true self) and *value in authenticity* (i.e. the extent to which this true self is actively encouraged). Unlike earlier theory, perceptions of *belonging* and *authenticity* are not conceptualised by Inclusion Theory as fundamentally existing in dynamic tension with one another. Rather, *perceived group inclusion* involves the simultaneous satisfaction of both psychological needs.

The relevance of Inclusion Theory to *social integration* can be understood by revisiting Blau's (1960) Theory of Social Integration, which stresses that individual-group attraction must be mutual for *social integration* to develop. Although *perceived group inclusion* does not appear explicitly as a component of *social integration* in recent conceptualisations or measures, descriptions of perceived "belongingness" appear in both *group attachment* and *group cohesion* (Ashforth & Mael, 1989; Bollen & Hoyle, 1990; Li et al., 2014; van der Vegt, 2010). A more direct recent reference to *perceived group inclusion* is found in Guillaume, et al. (2012) who describe *quality of social relations* as including the "extent to which individuals perceive themselves included in a work group" (p. 84). It is thus proposed that *group inclusion*, itself a relatively recent theoretical development, is a key theoretical facet of the psychological connection observable between individual and group.

2.3.5. Needs-Based Model of Reconciliation. A prominent contextual factor in South Africa is the nature of post-apartheid society. The Needs-Based Model of Reconciliation (NBMR) posits that individuals in a post-conflict society have differing group-based psychological needs: individuals belonging to social groups which are regarded as former perpetrator groups experience an increased *need for social acceptance*, whereas individuals belonging to social groups that are regarded as victim groups experience an increased *need for empowerment* (Shnabel & Nadler, 2008). The *need for social acceptance* is described by Shnabel and Nadler (2008) as a motivational force driven by the threatened image of the individual as moral and socially acceptable. Similarly, the *need for empowerment* is described as a state of psychological deprivation that motivates individuals to restore a personal sense of power and status (Shnabel & Nadler, 2008). Socio-emotional reconciliation is framed by Shnabel and Nadler (2008) as an act of social exchange, in which differentiated impaired psychological resources are satisfied and willingness to reconcile is thus increased.

The NBMR has subsequently undergone theoretical development and is now considered to be applicable in a wider range of contexts (Shnabel & Ullrich, 2013; Siem, von Oettingen, Mummendey, & Nadler, 2013). For example, the NBMR was later aligned with the content dimensions of the Big Two Theory (Abele, Cuddy, Judd, & Yzerbyt, 2008; SimanTov-Nachlieli, Shnabel, & Nadler, 2013). The Big Two Theory describes fundamental content dimensions (*agency* and *communion*) that underlie all social judgment. Threats to the *agency* dimension (as aligned with the *need for empowerment*) are described as motivating individuals to restore a sense of agency, control, competence, individualism, ability to pursue personal goals, security, respect and status (Abele, et al., 2008; SimanTov-Nachlieli, et al., 2013). Threats to the *communion* dimension (as aligned with the *need for social acceptance*) are associated with an enhanced motivation towards social connection, acceptance and warmth (SimanTov-Nachlieli, et al., 2013). The alignment between the "needs" described by the NBMR and broader, subsuming content dimensions was described by Shnabel and Nadler (2008) in their original proposition of the NBMR. The NBMR has thus gradually expanded in its application after beginning as a context-specific, post-conflict theoretical model.

In the South African context, employees may have differing group-related socio-emotional needs arising from the country's post-conflict social context that are present prior to joining an organisation, but which may nonetheless alter the nature of their psychological connection to workgroups. For example, a prominent feature of post-apartheid South African society is persistent social segregation that is closely aligned with high levels of socio-economic inequality (Struwig, et al., 2013). With respect to these contextual factors, the NBMR has also undergone theoretical development extending its application to the examination of barriers to social change, whereby individuals belonging to groups perceived as unjustly advantaged and disadvantaged experience differentiated socio-emotional motivations, a broader application than the original post-conflict context (Shnabel & Ullrich, 2013; Siem, et al., 2013). In this context, the satisfaction of the differentiated psychological needs of the advantaged and disadvantaged is framed as a catalyst for social change (Shnabel & Ullrich, 2013). Siem, et al. (2013) have also aligned aspects of Social Identity Theory (SIT) with the NBMR in the context of social inequality, for example, low perceived power as a need or motivational force is commented on in SIT. An individual may be motivated to improve their self-image by joining a social group enjoying higher status, if that option is available to them (Hogg & Abrams, 1998; Siem, et al., 2013).

In the organisational context, *psychological empowerment* is an established construct grounded in the ideas of theorists such as Conger and Kanungo (1988), Thomas and Velthouse (1990), Spreitzer (1995) and Menon (2001). In alignment with descriptions of empowerment found in the NBMR literature, employee *psychological empowerment* is conceptualised as the subjective experience of power, an experience and/or process of empowerment which has been interpreted by various streams of organisational research. A common conceptualisation is that of Menon (2001) who describes employee *psychological empowerment* as a cognitive state consisting of three dimensions: *perceived control*, *perceived competence* and *goal internalisation*. *Perceived control* refers to the perception of autonomy and control in the work context, for example, the ability of the individual employee to influence basic aspects of their work environment such as the use of resources, decision-making, work structure and flow. *Perceived competence* refers to internalised self-efficacy beliefs that the individual holds in relation to the work role they inhabit (Bandura, 1977; Menon, 2001). *Goal internalisation* is drawn from a conceptualisation of "power" as perceived personal energy and strength generated by shared group ideas, goals and perspectives (Menon, 2001). The development of this component of *psychological empowerment* was influenced by the concept of transformational leadership, in which the power of a compelling shared group vision to enable on an individual level is emphasised.

While the concept of a *need for social acceptance* has been included implicitly in existing conceptualisations of *social integration* in the form of *perceived group inclusion*, the psychological *need for empowerment* has not. Thus, while perceived *psychological empowerment* could be viewed as antecedent to the psychological bonds that *social integration* describes, it is also possible that individuals' perception of *psychological empowerment* communicated to them by a group is irreducible from the social bonds that develop between individual and group. It is proposed that the degree to which employees perceive themselves as *psychologically empowered* could be included as an indicator of *social integration* in the South African context. The argument for the inclusion of *psychological empowerment* thus rests on two considerations: (1) group membership-based individual psychological needs resulting from South Africa's post-apartheid social context may be indivisible from an individual's self-concept; and (2) the NBMR (and adaptations thereof) describe *psychological empowerment* as an experience that reflects a group-individual dynamic, as opposed to an individual experience which exists without the group context. Just as Inclusion Theory describes the agency a group exercises to accept and

include an individual, the expanded NBMR describes the group context as an environment in which the individual's need for *psychological empowerment* may be satisfied.

2.4. Measuring Social Integration

Social integration is typically measured with scales on a Likert-type response format, assessing individuals' perceptions of *social integration* at a point in time. In this section, the psychometric evidence base for the content and construct validity of different measures of *social integration* is reviewed, as well as the level of analysis and group of reference typically used. Appendix A contains a table where, for each study included in this review, both the conceptualisation and the approach to measurement of *social integration* have been provided. This table is provided as a reference point for the reader, to avoid repeating the information it contains unnecessarily in the dissertation text itself.

2.4.1. Content validity. Messick (1995) argues that no single measure can be considered fully equivalent to a construct and should be understood as one possible set of indicators of that construct. The extent to which the content of a measure is relevant and representative of a theorised construct constitutes its content validity, and contributes to the argument for construct validity. The content validity of existing operationalisations of *social integration*, or facets thereof, can be gauged by analysing the alignment between the conceptualisation and operationalisation of the construct (Messick, 1995). Alhough not the only definition of *social integration* (see Section 2.2.), the most commonly applied conceptualisation appears to be O'Reilly, et al.'s (1989) description of the construct as a "multifaceted phenomenon that reflects attraction to the group, satisfaction with other members of the group, and social interaction among the group members" (p. 22) (refer to Appendix A for the construct conceptualisation used by each study under review). The O'Reilly, et al. (1989) conceptualisation will be drawn on repeatedly in the review to follow.

In some instances, *social integration* has been operationalised by drawing on measures of theorised component parts of the construct to create composite scales (e.g. Horowitz & Horowitz, 2007; Newell, et al., 2008). As indicated in Section 2.2, the inclusion of the five identified facets of *social integration* is inconsistent. For example, an examination of the alignment between the conceptualisation and measurement of *social integration* in the O'Reilly et al. (1989) study would appear to indicate that "attraction to the group" (p.22) may have been understood by the authors to be equivalent to *group cohesion*, and was measured with an existing 3-item scale of *group cohesion*. In addition to this potential incongruence

between the conceptualisation and measurement of *social integration*, the conceptualisation and measurement of *group cohesion* has been contested and still appears to vary considerably (Bollen & Hoyle, 1990; McLeod & von Treuer, 2013). *Group cohesion* is theorised by some authors to consist of more than one dimension itself, but in some instances these dimensions are measured by single items, falling below the widely applied recommendation of three or four items per latent variable (Hinkin, 1998). For example, Seashore's (1954) 3-item Cohesion Scale, used in the measurement of *social integration* by Harrison, et al. (2002) and O'Reilly, et al. (1989), uses a single item to measure a *sense of belonging*, which Bollen and Hoyle (1990) proposed as a first-order factor of *perceived group cohesion*. Bollen and Hoyle (1990) therefore measure a *sense of belonging* with the recommended three items.

Similarly, Van der Vegt, et al.'s (2010) 3-item *social integration* measure identifies three theorised dimensions of the construct, each measured by a single item. In instances where *social integration* has been measured by single items it is thus unlikely that the content domain of *social integration* was assessed comprehensively (Hinkin, 1998; Gorsuch, 1997a; 2015). A variety of other measures have been included in operationalisations of the construct, for example, the number of times individuals had socialised with other team members away from work within the previous month (O'Reilly, et al., 1989). Harrison, et al. (2002) included an item measuring attraction towards other team members, a measure of *group cohesion*, a measure of *satisfaction with co-workers*, and an indication of willingness to work with the team in the future. Harrison, et al. (2002) also included two items measuring procedural justice, the inclusion of which is less clearly linked to how *social integration* is conceptualised, both in their research, and more broadly within the reviewed literature.

In other examples, authors have developed their own scales to measure *social integration* for the purposes of their research (Lin & Shih, 2008; Smith, et al., 1994; Van der Vegt, 2002; Van der Vegt, Bunderson, & Kuipers, 2010). For example, Smith, et al. (1994) applied O'Reilly, et al.'s (1989) definition of *social integration* as attraction to the group, satisfaction with co-workers, and social interaction within the group, and developed a unidimensional measure of *social integration*. Some authors have considered this scale to be essentially a measure of *group cohesion*, which could indicate incongruence between the proposed conceptualisation and operationalisation of *social integration* (Barrick, Bradley, & Colbert, 2007; Kaymak, 2011). While Smith, et al. (1994) conceptualised *social integration* as containing *satisfaction with co-workers*, their scale contained no items explicitly measuring satisfaction (i.e. the word "satisfaction" does not appear once).

Also citing O'Reilly, et al.'s (1989) conceptualisation of *social integration*, Lin and Shih (2008) created a 10-item scale with an underlying, highly intercorrelated three-factor structure. The latent variables in this measure were named *cohesion, satisfaction with co-workers* and *social interaction* in alignment with the O'Reilly, et al. (1989) definition (Lin & Shih, 2008). Van der Vegt (2002) created a 6-item scale to measure *social integration*, drawing on O'Reilly, et al.'s (1989) conceptualisation of the construct. This scale had two theoretical dimensions, *collaborative behavior* and *group identification and commitment*. Van der Vegt, et al. (2010) later created a shorter 3-item measure of *social integration*, again based on the O'Reilly, et al. (1989) definition. The three items in this scale were intended to measure *team cohesiveness*, *behavioural integration* and *personal satisfaction with the team*. Thus, some inconsistency appears to be present in the alignment between the definitions of *social integration* used in prior studies and the way that the construct has been measured.

2.4.2. Structure of the construct: Theory and empirical evidence. *Social integration* is repeatedly described as a construct that contains multiple dimensions. For example, O'Reilly, et al. (1989) describe *social integration* as "multifaceted" (p. 22), while Harrison, et al. (2002) refer to *group cohesion* as "a primary dimension of social integration" (p. 1034). To draw on the terminology of Brunner, Nagy and Wilhelm (2012), existing conceptualisations and measurement of *social integration* in the literature seem to imply a hierarchical or nested model. In some instances the proposed dimensions of *social integration* themselves appear to subsume multiple sub-constructs. For example, Guillaume, et al. (2012) group *affective commitment* and *group identification* together under an "umbrella term", *group attachment*, as does Van der Vegt (2002) (as *identification and commitment to work group*). Although there is some speculation that these two constructs may contain conceptual overlaps (e.g. Edwards & Peccei, 2007) they are generally regarded as distinct and have been applied as such, for example by Knight and Eisenkraft (2014). *Behavioural integration* is another example. Referred to as a "meta-construct" by Hambrick (1994), *behavioural integration* is theorised to subsume perceptions of collaborative behavior, information sharing and joint decision making experienced in workgroups (Van der Vegt, 2002; 2010). Finally, *group cohesion*, as described in Section 2.2.2., is theorised by Bollen and Hoyle (1990) to contain two distinct dimensions (*sense of belonging* and *feelings of morale*).

Scores for the theorised dimensions of *social integration* are sometimes aggregated to create composite, unidimensional measures on the basis of high intercorrelations (e.g. Harrison, et al., 2002; O'Reilly, et al., 1989). The combined score of the composite measure

is then used as an indicator of the conceptualised higher-order or unidimensional construct *social integration* (i.e. a parceled indicator). This approach can be critiqued on several levels, for example, when unadjusted correlations are relied upon as evidence of the unidimensionality of *social integration*, the presence of error variance is not taken into consideration. The practice is not limited to older studies and is still evident more recently, for example, Rico, et al. (2007) followed Harrison, et al.'s (2002) approach and combined individuals' scores on a *satisfaction with coworkers* measure (Gladstein, 1984) and a *cohesion* scale (Stokes, 1983) because the aggregated subscale scores were highly correlated (r = .79). Bollen and Hoyle (1990) have highlighted the need to distinguish between conceptual and empirical dimensionality, advocating against the practice of regarding high intercorrelations between theorised dimensions as equivalent to evidence of unidimensionality. They illustrate this point with the example of height and weight, where highly correlated data is present (which may present as empirical unidimensionality), but the conclusion that both height and weight are conceptually indistinct is not drawn. Evidence of higher-order structures must also be presented. For example, Lin and Shih (2008), finding high intercorrelations between theorised dimensions of *social integration* in a CFA analysis ($.73 < r < .91$) parceled the scores of each dimension to create indicators of *social integration* without presenting evidence that a subsuming higher-order latent variable was in fact present.

Examples also exist where facets typically conceptualised as falling within *social integration* are treated as separate constructs in analysis (Stahl, et al., 2010; Van der Vegt, 2002). For example, in a meta-analysis on the effects of cultural diversity in teams, Stahl, et al. (2010) separated *satisfaction with group members* from *social integration.* This analysis unexpectedly indicated that although greater cultural diversity was associated with lowered *social integration*, greater cultural diversity was also associated with increased *satisfaction with group members*. Had *satisfaction with group members* been included as part of *social integration* in this analysis without making this distinction (i.e. treating *satisfaction with group members* as a part of a unidimensional *social integration*) this result would not have been apparent. This example draws attention to the importance of examining the convergent/discriminant validity of potential first-order factors.

Conceptual overlaps and potential redundancies may be present within the components or sub-constructs included in this review of *social integration*. At the most obvious level, scales used to measure different components of *social integration* contain similar items. For example, items measuring the experience of belonging or being a part of a

group appear in Allen and Meyer's (1990) Affective Commitment Scale ("I feel a strong sense of belonging to my [workgroup]"), Bollen and Hoyle's (1990) Perceived Cohesion Scale ("I feel a sense of belonging to my workgroup"), and Jansen, et al.'s (2014) Perceived Inclusion Scale ("My workgroup gives me the feeling that I belong"). *Group identification* contains a dimension described as the sharing of group goals and values (Edwards & Peccei, 2007). *Psychological empowerment*, too, contains a dimension described as organisational *goal internalisation* (Menon, 2007). Edwards and Peccei (2007) have speculated that similar overlaps exist between *group identification* and *affective commitment* and suggested that scales for each are analysed together for this reason.

Finally, an examination of more robust quantitative analysis methods (exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)) in the existing literature revealed a mixed evidence base. For example, Smith, et al. (1994) reported a unidimensional measure of *social integration,* supported by EFA. However, that EFA contained three distinct scales (*informality of communication*, *communication frequency* and *social integration*) and was specified to have three common factors only (i.e. the items were "forced" onto three factors). No further details regarding the analysis were published, e.g. EFA or CFA analyses examining only the *social integration* scale for underlying latent variables. Similarly, Van der Vegt's (2002) *social integration* scale was conceptualised as having two dimensions, a behavioural (*perceptions of collaborative behavior*) and affective dimension (*identification and commitment to work group*). Along with a neighbouring *attitudinal dissimilarity* scale (measured with three items from a *job satisfaction* measure) the *social integration* scale was tested with CFA, the specified two-factor model fitting the data adequately. No investigation of potential underlying latent variables within the *social integration* scale was reported and it appears that *social integration* was assumed to be unidimensional. It is thus not clear if a one or two-factor model of *social integration* itself would have better fit the data.

Similarly, Liao, Chuang and Joshi (2006) treated a Chinese version of Van der Vegt's (2002) *social integration* scale as unidimensional in a CFA, along with *affective commitment* (to the workgroup) and *coworker satisfaction* as separate constructs. These neighbouring measures which Liao, et al. (2006) were evidencing as distinct from *social integration* are often included as a part of *social integration* (see Section 2.2.). The potential redundancy between their measure of *affective commitment* and the theorised affective dimension of the Van der Vegt (2002) *social integration* measure (*identification and commitment to work group*), itself possibly comprised of two dimensions, was thus not addressed.

2.4.3. Level of analysis. Past research appears to have collected individual scores, which were then typically aggregated to the group-level to serve as an indicator of a group's *social integration*. This practice typically follows a group-consensus exercise such as the interrater agreement exercise of James, Demaree and Wolf (1984) (e.g. Van der Vegt 2010). The indicator *social integration* is then used in analysis with other common diversity research group-level variables, for example, the gender variety of a workgroup can be quantified by calculating Blau's (1977) index (Harrison & Klein, 2007). Where measurements of *social integration* have been taken at multiple points in time, analysis at the team level has been further justified by means of intraclass correlations (e.g. Van der Vegt, 2010).

2.4.5. Group of reference. The workplace provides individuals with a range of groups which they can be members of. Experiences in groups vary, for example, *group attachment* is generally acknowledged to be stronger in smaller groups (Riketta & van Dick, 2005; van Knippenberg & van Schie, 2000).

2.5. Conclusion

Existing literature demonstrates no consistent model of *social integration*. Through a review of the content- and process-based literature relating to *social integration* within workplace diversity research, seven existing constructs were identified as important, constituting a working conceptualisation of *social integration* in the South African organisational context: *group attachment*, *group cohesion*, *satisfaction with co-workers*, *behavioural integration*, *quality of social interaction*, *perceived group inclusion*, and *psychological empowerment*. The identification of these sub-constructs, or theorised components of *social integration* informed the generation of an item pool for analysis, which will be discussed in detail in Chapter Three. Section 2.4. demonstrated that the way in which these theorised component parts relate to one another, and in which hierarchical structure, is neither clearly understood nor systematically evidenced. The analyses to follow aim to clarify the conceptualisation and measurement of *social integration.* The results of the proposed analyses will be examined in the context of this initial review of the literature (Chapter Five), noting similarities and/or deviations from the organisation of theory presented herein.

CHAPTER THREE: METHOD

This chapter begins with an outline of the research design. The approach to scale development and the research paradigm are then briefly discussed. Sampling procedure and research participants are described in detail. Finally, the measuring instruments drawn on in the present research are presented.

3.1. Research Design

The research was descriptive, cross-sectional and quantitative in nature. As responses to measures of *social integration* were collected at a single point in time, the research was cross-sectional, providing a 'snapshot' of reality. Cross-sectional data was considered appropriate as it allowed for an exploration of the latent variable structure of *social integration*, as comprised of the seven theorised sub-constructs identified in the preceding literature review. Quantitative data was gathered and subjected to both exploratory and confirmatory statistical analyses. The results assisted in refining the conceptualisation of the *social integration* construct as well as providing clarity on the appropriate measurement thereof, contributing to the development of a comprehensive measure of *social integration* for use in South African organisations.

3.1.1. Research approach. To develop the measure used in this study the first four steps of the well-known scale development guidelines proposed by Hinkin (1998) were followed. They are shown in Figure 1. The item generation approach (Step 1) was based on a "well-articulated theoretical foundation" (p. 105). Pre-existing ideas about the content domain of social integration were identified in Chapter Two, i.e. the existing conceptualisation of *social integration* as it exists in a stream of diversity-based literature was drawn on as a theoretical base, thus following a deductive approach. Existing scales representing *social integration* sub-constructs were drawn on to generate an item pool. All items generated were drawn from existing, well-evidenced scales in published literature. The chosen scales are detailed in Section 3.4.

Questionnaire administration (Step 2) is described in detail in Section 3.2. which outlines the sampling procedure. Following Preacher, Zhang, Kim, and Mels' (2013) guidelines, a cross-validation method was employed which involved randomly splitting the full sample into *calibration* and *validation* subsamples. Exploratory factor analysis (EFA) was conducted on the *calibration* subsample and confirmatory factor analysis (CFA) on the

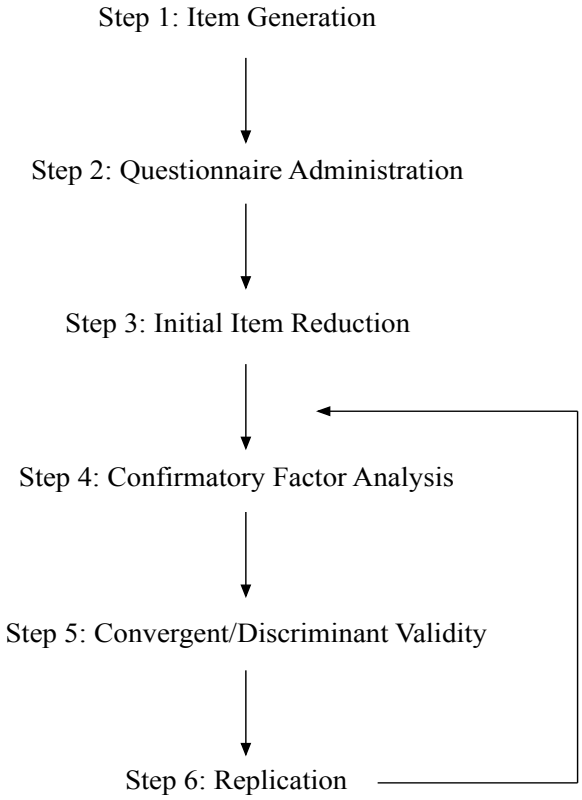

Figure 1. Reproduction of Hinkin's (1998) Scale Development Process.

validation subsample. An initial item reduction was conducted as part of the EFA (Step 3), the results of which are reported in Chapter Four. The focus, however, in the EFA analyses was not simply on item reduction, but on the identification of a meaningful latent variable structure. This is because *social integration*, as discussed in Chapter Two, was assumed to be a multi-dimensional and possibly hierarchical construct. Based on the results of the EFA, models of both a simple and hierarchical latent variable structure of *social integration* were hypothesised to adequately fit the *validation* subsample. These hypotheses were tested by cross-validating the models on the *validation* sample (Step 4). Higher-order models were contrasted for best fit on this subsample and post-hoc analyses on the same subsample tested the theoretical versus practical usefulness of *social integration* as a higher order latent variable, the results of which determine how the proposed scale of *social integration* in the South African context should be scored (i.e. at the level of first-order or higher-order latent variables) (Gorsuch, 2015).

Hinkin's (1998) fifth and sixth steps were not included in the present research because their inclusion would have resulted in a dissertation that exceeded the requirements of a

Masters degree (see Section 3.2.). These steps and their importance to consequent research will be addressed in Section 5.4. as a recommendation for future research.

3.1.2. Justification for the chosen research approach. It is the work of Haig (2005a; 2005b; 2008; 2012; 2014), in particular his integration of the EFA approach within a philosophy of science, which enables the methodological choices employed by this study to be located within the broader landscape of the scientific method. Haig (2005a) focuses on the use of EFA as a legitimate means of generating explanatory theories, a minority position in contrast to the mainstream hypothetico-deductive method with which CFA approaches are well aligned. Supported by CFA, this approach can be "profitably employed" by researchers (Haig, 2005a, p. 314; 2012; Preacher, et al. 2013). In relation to the Hinkin (1998) model, the item reduction (Step 3) process is described as an EFA analysis. Much debate surrounds the basic nature and worth of EFA as a method and some researchers view EFA as merely a data reduction technique and not a method of hypothesising theoretical models (Haig, 2005a).

Whilst EFA is often listed as a theory-generation exercise, a theory of inference to describe the logical progression from descriptions of observed variables to statements about latent variables is seldom explicitly elucidated or referenced when making use of the technique (Haig, 2005a). Haig (2005a) posits that EFA is legitimised by an abductive logic of theory generation, and that as a latent variable method EFA exploits the *principle of the common cause*, a fundamental precept of scientific inference. Abductive inference is described by Haig (2005a, p. 304) as follows:

> "It is commonly thought that inductive and deductive reasoning are the only major types of inference employed in scientific research. It is well known that conclusions of valid deductive arguments preserve the information or knowledge contained in their premises, but they do not add new information or knowledge. By contrast, inductive arguments are ampliative in that they add new information or knowledge to existing information and knowledge. However, inductive arguments, though ampliative, are *descriptive* in character because they reach conclusions about the same type of manifest attributes mentioned in their premises. Importantly though, science also adds to its store of knowledge by reasoning from factual premises to *explanatory* conclusions. This type of inference, which is widely ignored in scientific methodology, is known as *abduction.*"

Through abductive inferences drawn from EFA, it is possible to draw plausible explanatory theories (not necessarily truths, as with any observation) that can then be tested

(Haig, 2005a). While Haig (2005a, 2012) posits that a strong argument is made for the validity of the appropriate use of EFA techniques and associated abductive inferences, these abductive inferences are not in themselves proposed to be theoretically robust. Rather, they constitute an early stage of the theory development process that is only able to support a "weak logic of discovery" relating to underlying causal factors (Haig, 2005, p. 322). While some authors, such as Gorsuch (1983) have argued that CFA supersedes EFA in theoretical importance, Haig (2005a) argues for a complementary approach. This approach is used in cross-validation strategies, where model parameters are estimated by EFA in a *calibration* sample (Bentler, 1980; Preacher, et al., 2013). The model is then fitted to a *validation* sample to determine how well the model generalises to a second sample. This approach has received considerable support and would constitute Hinkin's (1998) Step 4 (Preacher, et al., 2013). It also relates to the early methodological requirements outlined by Thurstone (1947) and later Cattell (1978) that models obtained by EFA should generalise across samples. The more populations a model generalises to, the more general (i.e. less context-specific) the theory that supports that mathematical approximation of reality (the model) could be assumed to be.

3.2. Sampling Procedure

The research took place in partial fulfilment of a Masters degree in Organisational Psychology at the University of Cape Town (UCT). Prior to any research activities taking place, approval was applied for and granted by the UCT Section of Organisational Psychology, and thereafter from the UCT Faculty of Commerce Ethics in Research Committee (Appendix B). Data was collected by the author over several months in 2017 using an electronic, self-administered survey platform (Qualtrics, 2017) to which the UCT Faculty of Commerce holds a subscription. Due to time and resource limitations, a non-probability, "snowballing" sampling strategy was adopted, in which each participant was invited to pass on an anonymous electronic survey link upon completion of the survey. This approach, however, yielded few initial results and multiple organisations in both the public and private sector were simultaneously approached for formal permission to sample their employees. Although interest in the private sector was limited, ten public South African universities ultimately granted access to their employees for the purposes of the research, on the condition of individual and institutional anonymity.

Having gained formal access to an organisation's employees, a pre-approved communication was circulated (e.g. an email or notice on an electronic staff noticeboard) to

employees by the author, and in some instances by the organisation. This initial communication briefly described the study and the conditions under which contact was being made, and inviting those interested to complete the hyperlinked 5 to 10-minute online survey. Where possible, these communications were followed up with a reminder approximately two weeks later. Reminders included the initial communication content, with the addition of an introductory note thanking those who had already participated, or had taken note of the communication but had no interest in participating. With the exception of a few details specific to each organisation, these communications were standardised.

On the front page of the survey, participants were informed that their subsequent participation in the survey constituted informed consent: that their responses were fully anonymous, that participation was voluntary, that they would be able to withdraw their participation at any point, and that they would be able to access the study results if desired. This covering letter is included in a reproduction of the full browser-version survey in Appendix C. It was assumed that each participant had understood that they could withdraw from the questionnaire at any point, as per the informed consent agreement. Additionally, UCT Ethics in Research Committee policy highlighted the potentially sensitive nature of several demographic variables, and the use of these variables was addressed to the satisfaction of the Committee by making it clear to participants that, while their demographic data was requested and to what end, options to opt out were available in the form of a “prefer not to say” answer available for certain questions deemed potentially sensitive.

To screen out inappropriate participants, two screening questions were inserted after the cover letter page: (1) “Are you currently living and working in South Africa?” and, (2) “The questions that follow relate to your experiences within a workgroup, within an organisation. Do you currently work for an organisation (of any size)?”. Only a positive response to both questions would allow a participant to access the survey itself. Participants then proceeded to the survey items (detailed in Section 3.4.), presented over six clearly numbered pages (e.g. “page 1 of 6”) with clear instructions to “Please indicate the extent to which you agree or disagree with the following statements”. A screenshot (browser version) of the first page of survey items is displayed in Figure 2. In order to minimize missing data, a “forced response” setting was adopted for the full survey which did not allow participants to proceed from one page of the survey to the next without answering all items.

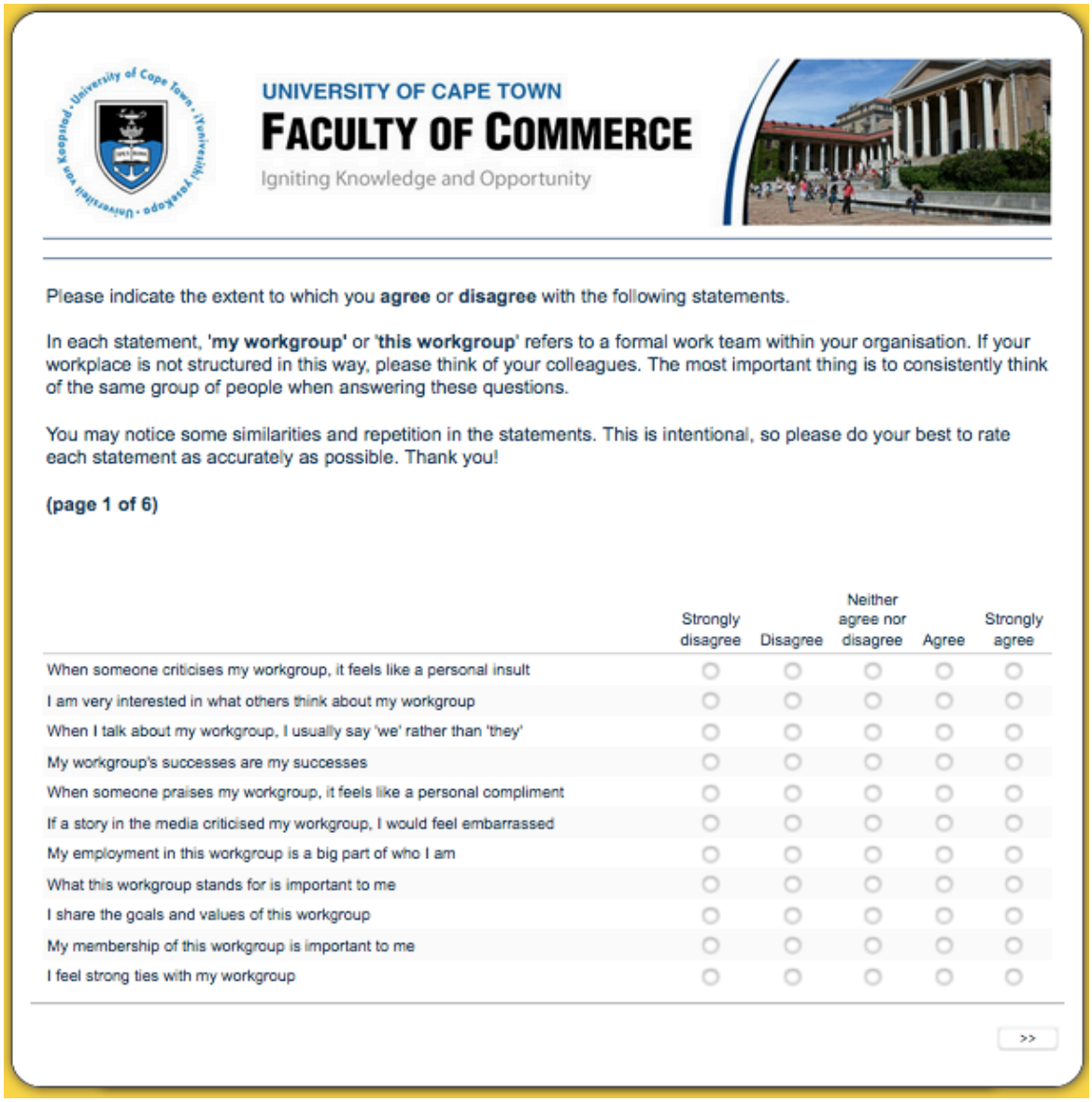

Figure 2. Page 1 of 6 of the Qualtrics Survey Platform (Browser Version)

3.3. Research Participants

The population was identified as all employees working in South African organisations (irrespective of their own nationality). This non-specific population was considered adequate as the research aimed simply to explore psychometric properties as a part of the scale development process, and not to accurately make inferences about a more specific group of people (Hinkin, 1998; Preacher, Zhang, Kim, & Mels, 2013). As described in Section 3.2., it is believed that many of the research participants were drawn from public South African universities, but as the survey was fully anonymous and participants were not asked for such sector-related details due to tenuous relevance to the research aims, this is left to speculation.

Following the initial two screening questions (working in South Africa and working in an organisation), a total of 729 participants had responded to the survey. This was reduced to 623 by omitting 106 incomplete responses. These 106 incomplete responses were participants who had abandoned the scale items included in the questionnaire at some point, for example, many participants did not answer more than two pages of items. It is possible that some participants abandoned the survey because it would not have been possible to leave out answers due to the "forced response" setting. Demographic items, on the other hand, included a "prefer not to say" response option for the potentially sensitive questions posed to participants, for example, language, gender and race. The sample of 623 was reduced further to 620 through the omission of three non-credible responses (i.e. multiple workgroups listed and gibberish written in various demographic fields). This final sample of 620 employees is expected to contain a certain level of error variance, e.g. response bias. These responses are difficult to identify with certainty and the impact on results is small in larger samples making use of restricted measures such as Likert-type response formats where extreme outlier values on the scale items are not possible. A small number of the final 620 participants dropped out at the point where they were asked for demographic information, ranging from 4 to 8 individuals (these missing values are categorised as "no response" in Table 1). The descriptive statistics of the sample are summarised in Table 1.

On the last page of the survey, participants were asked about the number of members in the workgroup which they had used as a reference when completing the questionnaire ("Please indicate how many people are in your workgroup"). Responses ranged from two to 8000 and are depicted graphically in Figure 3. Seventeen responses where participants indicated that their workgroups consisted of 100 people or more have been omitted from this histogram (N = 595; M = 15.36; SD = 13.57) for the sake of visual clarity. The omitted workgroup size values, in ascending order, are: 100; 130; 150; 190; 200; 200; 250; 300; 300; 400; 1000; 1300; 1500; 1500; 5000; 8000; and a single response where a participant wrote "thousands". Participants' age ranged from 22 to 76 (N = 614; M = 43.87; SD = 11.45), with no noticeable skew. The majority of participants were in middle or senior management roles and spoke English or Afrikaans. The under-representation of African language speakers in senior roles at South African universities is an ongoing challenge and the sample appears to reflect this status quo (Grove, 2017). Participants were also asked if they formally led their workgroups, with 208 (33.5%) participants indicating that they did, 408 (65.8%) indicating that they did not, and four participants (.6%) choosing not to respond to the question.

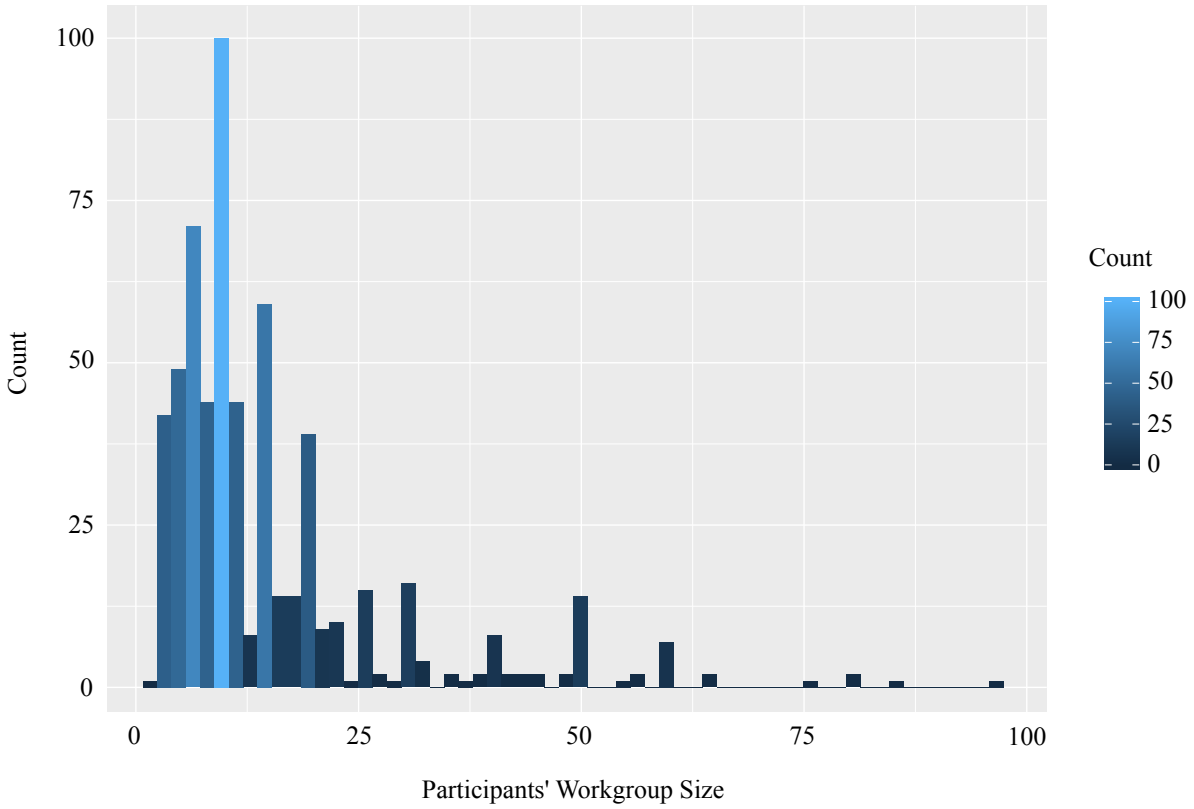

Figure 3. Responses to Question About Participants' Workgroup Size ($N = 595$)

Finally, a brief scale measuring South African living standards was included as a proxy for socioeconomic status ("Please indicate which of the following items are present in your household: Desktop/laptop computer; TV set; Motor vehicle; Electric stove/hotplate; Vacuum cleaner/floor polisher; Hot running water"). The measure positions residents of South Africa within three bands of living standards (du Plessis, Girdhari, Higgs, & Swanepoel, 2014). A thorough description of the scale is included in Section 3.4.9. Of the participants in the present research, four respondents (.6%) chose not to respond to this question, four respondents (.6%) placed in the lowest band of living standard, 30 respondents (4.8%) placed in the middle band, while the majority placed within the highest South African living standards category (N = 582; 93.9%). This relatively affluent majority corresponds with the managerial positions most of the sample held within their respective organisations.

The full sample (N = 620) was randomly split to generate two subsamples for the purposes of further analyses, using the *splitSample* function in the *semTools* package for R (or *semTools::splitSample*) (Pornprasertmanit, 2017; R Core Team, 2017). These samples were named the *calibration* ($N_1 = 310$) and *validation* sample ($N_2 = 310$), in alignment with

Table 1

Descriptive Statistics of the Full Sample

Variable	Description	*N*	%	Cumulative %
First language	Afrikaans	232	37.4	37.7
	English	271	43.7	81.7
	isiNdebele	1	.2	81.8
	isiXhosa	21	3.4	85.2
	isiZulu	33	5.3	90.6
	Sepedi	6	1.0	91.6
	Sesotho	3	.5	92.0
	Setswana	4	.6	92.7
	siSwati	2	.3	93.0
	Tshivenda	3	.5	93.5
	Xitsonga	3	.5	94.0
	Other	31	5.0	99.0
	Prefer not to say	6	1.0	100.0
	No response	4	.6	
Gender	Male	237	38.2	38.5
	Female	376	60.6	99.5
	Prefer not to say	3	.5	100.0
	No response	4	.6	
Race	African	107	17.3	17.4
	Coloured	51	8.2	25.6
	Indian/Asian	54	8.7	34.4
	White	358	57.7	92.5
	Other	7	1.1	93.7
	Prefer not to say	39	6.3	100.0
	No response	4	.6	
Level of education	Matric Certificate	19	3.1	3.1
	Diploma	34	5.5	8.6
	Undergraduate	32	5.2	13.8
	Honours	95	15.3	29.2
	Masters	232	37.4	66.9
	PhD	204	32.9	100.0
	No response	4	.6	

Note. $N = 620$; Cumulative percentages calculated less missing data

Descriptive Statistics of the Full Sample (Continued)

Variable	Description	*N*	%	Cumulative %
Position in current job	Entry	13	2.1	2.1
	Junior	94	15.2	17.4
	Mid management	276	44.5	62.2
	Senior management	233	37.6	100.0
	No response	4	.6	
Nature of employment contract	Permanent contract	518	83.5	84.1
	Temporary contract	86	13.9	98.1
	Agency / Casual	1	.2	98.2
	Other	11	1.8	100.0
	No response	4	.6	
Workgroup size	1 – 10	307	49.5	50.2
	11 – 20	178	28.7	79.2
	21 – 30	53	8.5	87.9
	31 – 40	18	2.9	90.8
	41 – 50	22	3.5	94.4
	51 – 60	10	1.6	96.1
	61 – 70	2	.3	96.4
	71 – 80	2	.3	96.7
	81 – 90	2	.3	97.1
	91 – 100	2	.3	97.4
	101 +	16	2.6	100.0
	No response	8	1.3	
Age	21 – 25	19	3.1	3.1
	26 – 30	73	11.8	15.1
	31 – 35	85	13.7	28.8
	36 – 40	78	12.6	41.5
	41 – 45	84	13.5	55.2
	46 – 50	82	13.2	68.6
	51 – 55	80	12.9	81.6
	56 – 60	65	10.5	92.2
	61 +	48	7.7	100.0
	No response	6	1.0	

Note. $N = 620$; Cumulative percentages calculated less missing data

the methodology described in Section 3.1.1. Descriptive variables were not included in the datasets of the two samples as no analyses containing these variables were planned. The two datasets were thus highly anonymised.

3.4. Measuring Instruments

The administered questionnaire consisted of 87 items from pre-existing scales (72 items) and demographic variables (15 items). The questionnaire contained instruments to measure the following seven psychological constructs or themes as identified in the literature review: *Group attachment* (comprised of *group identification* and *affective commitment*)*, group cohesion, satisfaction with co-workers, behavioural integration, quality of social relations, perceived group inclusion* and *psychological empowerment.* Responses to all scales were recorded on a 5-category Likert-type response format, ranging from *strongly disagree* (coded as 1) to *strongly agree* (coded as 5). Responses to these scales are typically classified as interval or continuous data and the scales are scored by averaging item scores, higher scores indicating greater experiences of the construct in question. The treatment of scale scores in the present research is discussed in detail in Chapter Four.

3.4.1. Group identification. *Group identification* was measured using adapted versions of Mael and Ashforth's (1992) 6-item Organisational Identification Scale (OIDS) and Edwards and Peccei's (2007) 6-item Organisational Identification Scale. Original and adapted versions of these scales are available in Appendix D.

Considered by some to be the most commonly used measure of OID, Mael and Ashforth's (1992) scale is not without criticism. The scale is contested on the basis that it is not well aligned with the original authors' conceptualisation of the construct, neglecting subcomponents of the construct that have been proposed by subsequent authors (e.g. Edwards & Peccei, 2007; Johnson, Morgeson, & Hekman, 2012; van Dick, et al., 2004). For example, five of the six scale items originate from an earlier Identification with a Personal Group Scale (Mael & Tetrick, 1992) and were intended to measure shared experiences. However, examples can be found of the Mael and Ashforth (1992) OIDS, both of its prior use in the South African context, and of the validity of its use in a workgroup context in a variety of settings (i.e. identification with workgroups). The scale's unidimensionality when adapted for use in workgroups has been consistently supported (e.g. Marique & Stinglhamber, 2011; Tangirala & Ramanujam, 2008) as well as its internal consistency. For example, Cronbach alphas of .90 (Johnson, Morgeson, Ilgen, Meyer, & Lloyd, 2006), .92 (Marique &

Stinglhamber, 2011), and .91 (Millward & Haslam, 2013) have been reported, all in samples in which a 5-point Likert-type scale was used as a response format. Similarly, internal consistency has been reported in the South African context, for example, Cronbach alphas of .88 (7-point scale; focus on organisational identification) (De Braine & Roodt, 2011) and .86 (7-point response scale; focus on brand identification) (Bang, Lee, & Swart, 2014). All scale items were reworded, replacing "this organisation" with "my workgroup" (e.g. "When I talk about my workgroup, I usually say "we" rather than "they").

Five of the six items in Edwards and Peccei's (2007) OIDS were used due to (1) the comprehensive theoretical review that informed the creation of the scale; and (2) the high quality of the available supporting psychometric evidence. This scale is positioned in the literature as an improvement on earlier scales such as Mael and Ashforth's (1992), particularly due to its inclusion of items relating to the cognitive bond between individual and group (Edwards & Peccei, 2007; Johnson, et al., 2012). Edwards and Peccei (2007) proposed that OID is comprised of *self-categorisation and labeling*, *shared organisational goals and values*, and a *sense of attachment, belonging, and membership of the organisation*. Although this specific scale does not appear to have been previously tested in the South African context, it has demonstrated high internal consistency in the United Kingdom (α = .93**;** Edwards & Peccei, 2010; α = .94; Fuchs & Edwards, 2012) and Germany **(**α = .90; Knoll & van Dick, 2012), the latter on a 7-point scale. A three-dimensional, highly intercorrelated structure was supported by confirmatory factor analysis (CFA) in the original scale development, however the scale has also been considered unidimensional, supporting the authors' conceptualisation of the construct (Edwards & Peccei, 2010). In support of discriminant validity, OID was demonstrated to be distinct from closely related constructs (Edwards & Peccei, 2007). The scale has been adapted to a "workgroup" reference group, demonstrating internal consistency (α = .90). The scale was originally developed within the United Kingdom's National Health Service (NHS) and it was thus necessary to replace "the NHS" with "my workgroup" in all items. A single item ("I consider myself an NHS person") was excluded because the rewording would not have made sense. A sample item from the scale is "I feel strong ties with my workgroup".

3.4.2. Affective commitment. *Affective commitment* (AC) was measured using seven items from the 8-item *affective commitment* subscale of Meyer and Allen's (1990) 24-item Organisational Commitment Scale (OCS). The scale was chosen because it is widely used and has demonstrated good psychometric properties in a wide variety of settings. The scale

has also been adapted to a workgroup focus (α = .82; Abu Bakar, Dilbeck, & McCroskey, 2010). In the South African context, Cronbach alphas of .74 (Simons & Buitendach, 2013), .90 (Nujjoo & Meyer, 2012) and .87 (Field & Buitendach, 2011), the latter on a 7-point scale, have been reported. Although based on a unidimensional conceptualisation of *affective commitment*, the scale sometimes reveals a two-factor solution which is posited to stem from the negatively worded items (Merritt, 2012). In order to improve the construct validity of the scale, Merritt (2012) thus suggests modifying these items to be positively worded and this approach was adopted in the present research. Both versions of the scale (original and positively rephrased) are available in Appendix E. As well as rephrasing the negatively worded items, the wording of each item was adjusted to reflect the workgroup focus of this study. A 7-item, positively-worded version of the scale has demonstrated internal consistency (α = .83) and unidimensionality (Merritt, 2012). One of the items ("I think that I could easily become as attached to another workgroup as I am to this one") is sometimes excluded because it tends to exhibit low item-total correlations and factor loadings (Merritt, 2012). This item was thus excluded from the scale. A sample item from the *affective commitment* scale is "I would be very happy to spend the rest of my career with this workgroup".

3.4.3. Group cohesion. Perceptions of *group cohesion* (GC) were measured using Bollen and Hoyle's (1990) 6-item Perceived Cohesion Scale (PCS). The scale was originally developed with larger reference groups in mind (e.g. cities and colleges), but has also been validated for use in reference to smaller groups of four to five individuals (e.g. Chin, Salisbury, Pearson, & Stollak, 1999). The PCS was chosen primarily on the basis of its alignment with *group cohesion* theory provided in Section 2.4.2. and sound psychometric support. The PCS is based on a two-factor theoretical conceptualisation: *sense of belonging* and *feelings of morale.* While conceptually distinct, the factors were virtually perfectly correlated in Bollen and Hoyle's (1990) research and they considered the scale to be empirically unidimensional. This was confirmed in a smaller reference group context by Chin, et al. (1999), however they felt a two-factor model provided a slightly better fit. Unidimensionality has been corroborated by other researchers, for example, Gesell, et al. (2016) found that all six items loaded onto a single factor. While Bollen and Hoyle (1990) developed the scale using a 10-point Likert-type response scale, 5-point scales (1 = *strongly disagree*; 5 = *strongly agree*) have subsequently been adopted. For example, using a 5-point scale, Decoster, et al. (2013) found that the scale demonstrated internal consistency (α = .83), as did Gesell, et al. (2016) (α = .95). The scale has also demonstrated internal consistency in

the South African context, (α = .83; Pienaar, 2009). The original items contain blanks (i.e. "___") in order for researchers to indicate the group to which the scale refers. Each item was edited to include "my workgroup", for example, "I feel that I am a member of the ___ community" became "I feel that I am a member of my workgroup", and "___ is one of the best schools [cities/organisations] in the nation" became "My workgroup is part of one of the best organisations in the country" (the word "nation" was replaced with "country" in this item to allow it to read well in the South African context). The original and adapted version of the scale are available in Appendix F.

3.4.4. Satisfaction with co-workers. *Satisfaction with co-workers* was measured using Aaron, McDowell, and Herdman's (2014) 5-item Team Satisfaction Scale (TSS), adapted from Hackman and Oldham's (1980) General Satisfaction Scale. *Satisfaction with co-workers* has previously been measured in *social integration* research with items from Smith, Kendall, and Hulin's (1969) Job Descriptive Index (e.g. Newell, et al., 2008; O'Reilly, et al., 1989). The Job Descriptive Index does not use a Likert-type response format. As the proposed research aimed to generate a *social integration* scale, a measure for *satisfaction with co-workers* that uses a Likert-type response format was preferred. This would mean that a consistent response format could be used across all items, avoiding potential confusion for participants. In other instances, scales were not named or reported (e.g. Harrison, et al., 2002; Rico, et al., 2007). Lin and Shih (2008) generated their own *social integration* scale containing Van der Vegt, Emans, and Vliert's (2001) *satisfaction with co-workers* as one of three sub-components of *social integration*. However, none of the three items measuring *satisfaction with co-workers* contained the word "satisfaction". Thus, for the focus, clarity and quality of its items, the Aaron, et al. (2014) scale was chosen for use. Although not tested in the South African context, and recently developed, the scale's clarity appears to be reflected in its high internal consistency in a sample of undergraduate students in the United States (α = .93; 7-point scale) (Aaron, McDowell, & Oldham, 2014). In order to maintain a consistent response format, the TSS was measured on a 5-point Likert-type response format. In all items, the word "team" was replaced by "workgroup". Thus, a sample item from the TSS reads, "I am satisfied with my workgroup". The original and adapted versions of the TSS are available in Appendix G.

3.4.5. Behavioural integration. *Behavioural integration* was measured using the 3-item *perceptions of collaborative behaviour* subscale of Van der Vegt's (2002) 6-item Social Integration Scale (SIS) and six items from Smith, et al.'s (1994) 9-item Social Integration

Scale (SIS). Original and adapted versions of each scale are available in Appendix H. The Van der Vegt (2002) scale has practical limitations. It has not been widely used and has not been tested in the South African context. Despite these limitations, the scale is an existing operationalisation of *social integration*. In Van der Vegt's (2002) sample of elementary school teachers in the Netherlands, the SIS demonstrated good internal consistency (α = .84) and in a Chinese sample of working adults, Liao, Chuang, and Joshi (2006) reported good internal consistency (α = .89). A sample item from the *perceptions of collaborative behaviour* subscale is "My colleagues help me to do a good job".

Six items from Smith, et al.'s (1994) 9-item Social Integration Scale (SIS) were also included as measures of *behavioural integration* because the items were aligned with the description of *behavioural integration* in Section 2.2.4. The 6-item adapted version of the scale excludes the three negatively worded items in the original 9-item scale. Lin, Liu, and Tsai (2012) excluded these items due to poor factor loadings and the remaining 6-item SIS demonstrated excellent reliability (α = .92) in their Taiwanese sample. To avoid participant confusion, the adapted, positively-worded version of the scale was chosen. Neither the six nor nine item versions of the scale have been previously tested in the South African context, but Smith, et al's (1994) scale has shown good psychometric properties in a variety of settings, such as within top management teams (α = .85; Smith, et al., 1994), individuals participating in a business competition (α = .70; Foo, Sin, & Yiong, 2006) and MBA students in the US (α = .82; Swann, et al., 2000). Items were reworded to focus on workgroups (e.g. "The members of my workgroup are quick to defend each other from criticism by outsiders" and "The members of my workgroup are always ready to cooperate and help each other").

3.4.6. Quality of social relations. *Quality of social relations* was measured using the 3-item *social interaction* subscale from Lin and Shih's (2008) 10-item Social Integration Scale (SIS). Original and adapted versions of the scale are available in Appendix I. Lin and Shih (2008) reported support for the unidimensionality and internal consistency (α = .89; 7-point scale) of this subscale in a large Taiwanese sample. The scale does not appear to have been used beyond Lin and Shih's (2008) initial research and the paucity of psychometric evidence is a limitation to the scale's inclusion. However, what psychometric evidence is present is strong and in alignment with the conceptualisation of *quality of social relations* proposed in the preceding review of *social integration* literature. Further, the conceptual overlap between the 6-item Smith, et al., (1994) SIS proposed above as a measure (in part) for *behavioural integration,* and *quality of social relations* is significant. Certain items could

arguably have been posited as measures of both components (e.g. “The members of my workgroup get along together very well” and “The members of my workgroup really stick together”). As described previously, the response format was adjusted to a 5-category Likert-type scale in order to maintain consistency. All items were reworded to reflect the workgroup focus of the study (e.g. “Members in my workgroup interact socially outside of work”).

3.4.7. Perceived group inclusion. *Perceived Group inclusion* (PGI) was measured using Jansen, et al.’s (2014) 16-item Perceived Group Inclusion Scale (PGIS). Original and adapted versions of the scale are available in Appendix J. Based on a 4-dimensional theoretical conceptualisation (*group membership*, *group affection*, *room for authenticity* and *value in authenticity*) the PGIS demonstrated a higher order two-factor structure in Jansen et al.’s (2014) initial analysis: *belonging* and *authenticity.* Jansen, et al. (2014) reported Cronbach alphas of .94 (*belonging*, 8 items) and .95 (*authenticity*, 8 items) for these subscales in a sample of students in workgroups. The scale has subsequently exhibited unidimensionality in a workgroup setting ($\alpha = .87$) (Jansen, et al., 2016). Nomological and predictive validity exercises have both further supported the criterion-related validity of the scale (Jansen, et al., 2014). The PGIS has not yet been tested in a South African population, but was included because it is the most current and refined operationalisation of Inclusion Theory, which has had several iterations of development. A sample item from the *belonging* subscale is “My workgroup gives me the feeling that I belong”, and from the *authenticity* subscale, “My workgroup encourages me to be who I am”. Each item was rephrased, replacing “this group” with “my workgroup” in order to reflect the specific study focus.

3.4.8. Psychological empowerment. *Psychological empowerment* (PE) was measured using Menon’s (2001) 15-item Psychological Empowerment Scale (PES). Original and adapted versions of the scale are available in Appendix K. Originally developed in the United States and Canada, the scale was tested locally in a large study in the South African National Defence Force (SANDF) (Kotze, Menon, & Vos, 2007). The PES, in its original form contains three theoretically-derived dimensions which have been supported empirically in Western countries: *perceived control*, *perceived competence*, and *goal internalisation* (Dimitriades, 2005; Menon, 2001; Menon & Hartmann, 2002). In South Africa, the scale has exhibited lower construct validity for non-English speakers, leading to speculation that the construct may be culturally bound (Kotze, et al., 2007). For this reason, and because of high levels of intercorrelation noted between subscales in South Africa, the scale may prove to be unidimensional in the present research (Kotze, et al., 2007; Menon & Kotze, 2007).

The full 15-item PE scale has demonstrated excellent reliability among African (α = .91); Asian and coloured (α = .88); and white (α = .90) respondents in Kotze, Menon and Vos' (2007) SANDF sample. The Menon (2001) PES is one of two major *psychological empowerment* scales in use in the organisational context, the other being Spreitzer's (1995) Psychological Empowerment Scale which has also been tested in the South African context (e.g. Stander & Rothmann, 2009). The Menon (2001) scale was ultimately chosen because the conceptualised content and dimensionality of the scale were aligned to the conceptualisation of empowerment explored in Section 2.3.5. Menon's (2001) description of *psychological empowerment* has also appeared in literature on the Needs Based Model of Reconciliation (NBMR) (Shnabel & Ullrich, 2013). A sample item is "I can control the way work is done in my workgroup". Each item containing the word "organisation" was rephrased, replacing "organisation" with "workgroup" to reflect the study context.

3.4.9. Demographic characteristics. The following demographic characteristics were measured: age, first language, gender, race, level of education, workgroup size, organisational position, leadership status, employment relationship status and socio-economic status (SES), the latter by means of a proxy indicator, the short form Living Standards Measure (LSM) (du Plessis, Girdhari, Higgs, & Swanepoel, 2014). The short form LSM classifies people into one of three bands of living standards, based on absence or presence of household objects and infrastructure: (1) desktop/laptop computer; (2) TV set; (3) motor vehicle; (4) electric stove/hotplate; (5) vacuum cleaner/floor polisher; and (6) hot running water. The short form LSM was chosen as a proxy for SES because the measure is independent of other demographic variables, e.g. race and was developed specifically for the South African socio-economic context (du Plessis, et al., 2014). The decision tree that accompanies the short form LSM is available in Appendix L.

3.5. Statistical Analyses

Statistical analyses were conducted using R Version 3.4.2 (R Core Team, 2017) in the RStudio Version 1.1.383 environment (RStudio Team, 2016). The aim of the statistical analyses was to thoroughly explore and, in some instances, confirm the latent factorial structure. The CFA work was conducted in *lavaan*, Version 0.5-23.1097 (Rosseel, 2012; 2017), while the EFA analyses were calculated in *psych* Version 1.7.8 (Revelle, 2017a). Where other R packages were used, reference is made to this when relevant.

CHAPTER FOUR: RESULTS

This chapter begins with a brief explanation of the common factor model and the shared assumptions applicable to both exploratory and confirmatory factor analysis. Detailed results from analyses on the *calibration* and *validation* subsamples are then presented.

4.1 Assumptions of the Common Factor Model

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) share a common, underlying set of assumptions that must be satisfied in order for the models generated by those techniques to be considered adequately accurate (Flora, LaBrish, & Chalmers, 2012). Both techniques seek to model relationships between groups of observed variables and smaller numbers of underlying, unobserved latent variables which are theorised to influence the variation and covariation of those observed variables (Flora, et al., 2012; Gorsuch, 1997a). Thus, both EFA and CFA techniques fit models in either an exploratory (unrestricted) or confirmatory (restricted) manner to matrices of bivariate relationships, for example, the Pearson correlation matrix or the covariance structure, when dealing with continuous data (Gorsuch, 1997a). Drawing on Flora, LaBrish and Chalmer's (2012) and MacCallum, Widaman, Zhang, and Hong's (1999) explanation of the model, the common factor model can be expressed in linear form as follows[1]:

$$x_j = \lambda_1 \xi_1 + \lambda_2 \xi_2 + \lambda_k \xi_k + \delta_j \quad (1)$$

Where x is an observed dependent variable ($N = j$) of p observed variables, ξ are explanatory common factors (of which there are r in total and k is the k^{th} common factor), λ are the regression coefficients relating to each common factor and δ_j is the "error", or "unique factor" term for x_j. The unique factor term indicates the unique variance attributable to the observed variable, i.e. that variance which is uncorrelated with the explanatory common factors (Gorsuch 1997a; Flora, et al., 2012). This is the fundamental difference between principal components analysis (PCA) and the common factor model. PCA has no unique factor term and thus makes the assumption that each observation contains no unique or error variance, forcing a common factor solution on the data (Gorsuch, 1997a). Equation One can also be expressed in matrix form:

$$\mathbf{x} = \mathbf{\Lambda\xi} + \boldsymbol{\delta} \quad (2)$$

[1] LISREL (Jöreskog & Sörbom, 2015) notation is used primarily.

Where **x** is a *p* x 1 vector of *p* observed variables, **Λ** is a *p* x *r* matrix of factor loadings, **ξ** is an *r* x 1 vector of *m* common factors, and **δ** is a *p* x 1 vector of *p* error values (Flora, et al., 2012; Preacher, Zhang, Kim, & Mels, 2013). This equation is expressed using the notation for an exogenous (independent) variable in the CFA tradition, but could equally have been expressed with notation for an endogenous (dependent) variable: $\mathbf{y} = \mathbf{\Lambda\eta} + \boldsymbol{\varepsilon}$. Both EFA and CFA modelling techniques follow from the common factor model. In CFA:

$$\mathbf{\Sigma} = \mathbf{\Lambda}\,\mathbf{\Phi}\,\mathbf{\Lambda}' + \mathbf{\Theta}_{\delta} \tag{3}$$

Where **Σ** is a *p* x *p* population covariance matrix, **Λ** is a *p* x *r* matrix of factor loadings, **Φ** is an *r* x *r* interfactor covariance matrix (of **ξ** latent variables), $\mathbf{\Lambda}'$ is the transpose of **Λ** and $\mathbf{\Theta}_{\delta}$ is a *p* x *p* covariance matrix of the error/unique factor values of the observed variables. CFA with continuous data is typically estimated from a covariance structure, although a correlation matrix could also be used. This is more often the case in EFA (which in turn could be estimated from the covariance matrix), in which case:

$$\mathbf{P} = \mathbf{\Lambda}^{*}\,\mathbf{\Phi}^{*}\mathbf{\Lambda}^{*\prime} + \mathbf{\Theta}_{\delta}{}^{*} \tag{4}$$

Where **P** is a *p* x *p* population correlation matrix and $\mathbf{\Lambda}^{*}$, $\mathbf{\Phi}^{*}$, $\mathbf{\Lambda}^{*\prime}$ and $\mathbf{\Theta}^{*}$ are re-scaled versions of **Λ**, **Φ**, $\mathbf{\Lambda}'$ and **Θ**. As can be seen in equations three and four, the models do not contain direct observations. EFA and CFA are thus variants of a general model and vary by the constraints placed upon them. The data contained in sample correlation (**R**) or covariance (**S**) matrices, should it be sufficient, is used to estimate terms **Λ**/$\mathbf{\Lambda}^{*}$, **Φ**/$\mathbf{\Phi}^{*}$ and $\mathbf{\Theta}_{\delta}/\mathbf{\Theta}_{\delta}{}^{*}$. These estimated matrices are then able to solve for **Σ**/**P**, generating model-implied population correlation or covariance matrices (Flora, et al., 2012). The discrepancy between a sample matrix and the model-implied matrix is described as the *sample discrepancy* by Cudeck and Henly (1991) and is viewed as an expression of model fit, i.e. a limitation of the mathematical model itself ("model error") as opposed to error introduced into the data during sampling ("sampling error") (MacCallum, 2003; MacCallum & Tucker, 1991; Preacher, et al., 2013). The quality of the sample covariance or correlation matrix used to estimate model parameters is thus crucial. An introduction of the common factor model necessitates a discussion of the basic assumptions of the model and the applied practice thereof.

4.1.1. Categorisation of data. All scales in the present study were measured on a 5-category Likert-type response format, ranging from *strongly disagree* to *strongly agree* (see Appendix C for a reproduction of the browser version of the electronic survey presented to

participants). While numbers were assigned to the 5-category format for the purposes of coding, participants were not presented with a numbered response scale, merely the five ordinal categories (*strongly disagree; disagree; neither agree nor disagree; agree; strongly agree*). Lacking the presence of a linear scale to imply equal intervals, any classification of these five data categories as having equal intervals of measurement would assume that each participant privately understood the five ordinal categories to have properties that were not specified explicitly by instruction, or implicitly implied by the presentation of the survey.

Data of this nature is still sometimes classified as a continuous or interval level of measurement in applied behavioural research (Flora, et al., 2012; Jöreskog & Moustaki, 2001, Jöreskog, 1994). This trend is typically traced to the origins of common factor modelling in the behavioural sciences. Introduced by Spearman (1904) and extensively developed by Thurstone (1935; 1947), common factor modelling largely evolved in an area of psychology that dealt with continuous data, in the form of multiple ability test scores. EFA models subsequently began to be applied to data measured with the now ubiquitous Likert-type scale by treating that data as interval or continuous (Flora, et al, 2012). While techniques to analyse ordinal data have long been available in CFA modelling, this approach has been less commonly embraced in applied EFA modelling in the behavioural sciences (Lee, Zhang, & Edwards, 2012) despite these methods frequently demonstrating more accurate results (Jöreskog, 1994; Flora, et al., 2012; Holgado-Tello, Chacon-Moscoso, Barbero-Garcia, & Vila-Abad, 2008). All data were thus considered to be ordinal for the purposes of analysis.

4.1.2. Linear relationships between variables. As the general factor model is linear in nature, this assumption is basic but fundamental. To assess linearity in the relationship between two variables, the traditional visual examination of bivariate scatterplots is useful when variables are truly continuous, but scatterplot matrices need to be adjusted when ordinal data is at hand. For example, Flora, LaBrish and Chalmers (2012) suggest enhancing bivariate scatterplots of ordinal data by adjusting the size of each data point according to the frequency with which that data point occurred. A similar solution was opted for in the present research, where heatplot *geom_tiles* (a feature of the *ggplot2* package) with a frequency colour scale were created (Wickham, 2017). As there were five response options in each of the two variables plotted against each other, 25 (5 x 5) combinations were thus possible. Figure 4 presents an example of the *geom_tiles* with univariate histograms on the diagonal. A clear diagonal line is visible in each heatplot, indicating that linear relationships are present in each pair of variables. These graphic displays allow bivariate linearity in the subsamples to

become evident without creating the illusion of interval or continuous data, as a scatterplot might (i.e. with no spaces between data points, aligned with the ordinal data categorisation).

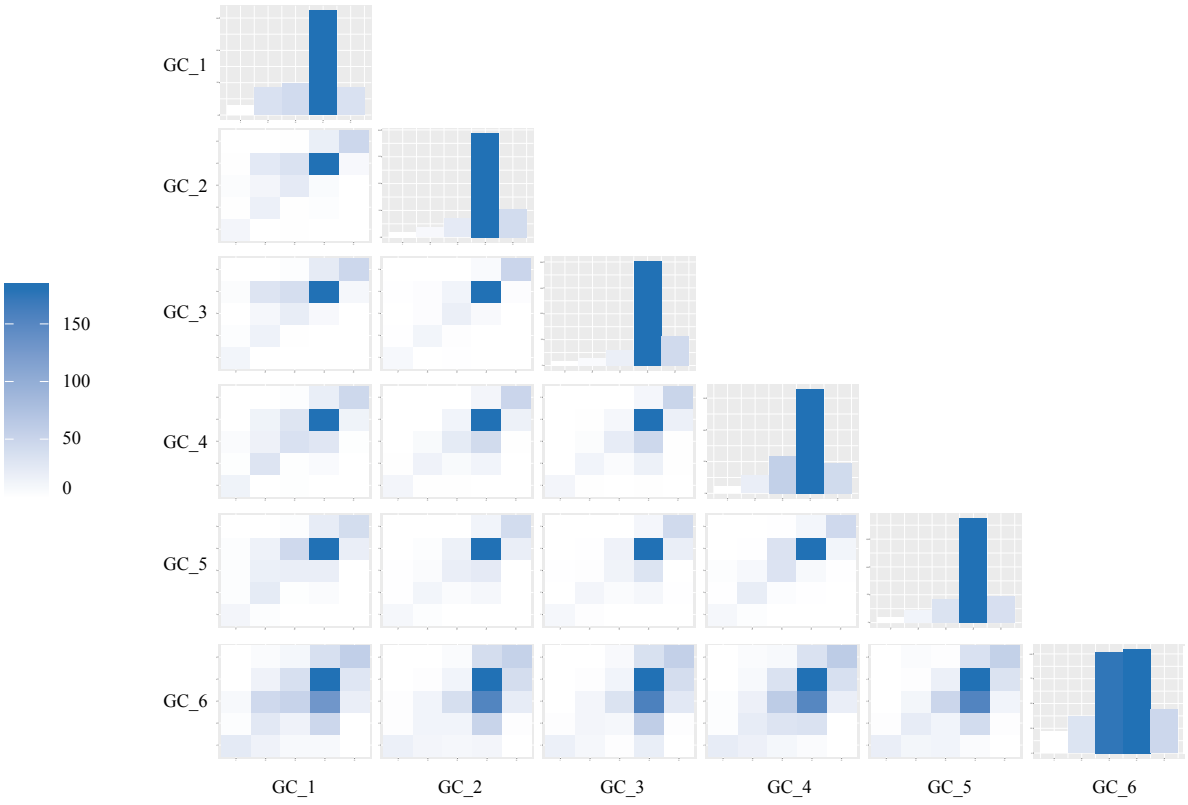

Figure 4. Examination of Bivariate Linear Relationships (Calibration Sample)

In cases in which Pearson product-moment correlations are not appropriate to the data, i.e. when variables are not measured using an interval-level response format, and/or there are non-linear relationships and/or normally distributed univariate data, both EFA and CFA models can be estimated by first calculating a polychoric **R** matrix (Flora, et al, 2012; Rosseel, 2017). The term "polychoric correlation" dates to Karl Pearson's era, but these correlations are now more commonly described as inferred correlations, or correlations between two latent variables (Forero & Maydeu-Olivares, 2009; Uebersax, 2017a). The basic premise of the polychoric **R** matrix is that, if linear relationships are present in ordinal observed data (provided each variable pair satisfies an assumption of bivariate normality) the conclusion may be drawn that beneath the observed ordinal data lies a continuous variable (Lee, Zhang, & Edwards, 2012; Uebersax, 2017a). The advantages of using polychoric instead of Pearson **R** matrices with ordinal Likert-type response format data in EFA and CFA model estimation is not merely conceptual, but has been demonstrated in practice (Flora, et al., 2012; Jöreskog, 1994). For example, when ordinal data (5-point/category) is

symmetrically distributed, sample Pearson correlations are generally attenuated (lowered, in error) when compared to population values (Flora, et al., 2012). When ordinal data has a positively or negatively skewed univariate distribution, the sample Pearson correlation has been observed to become more pronounced, sometimes larger and sometimes smaller than population values (Flora, et al., 2012). As the **S** or **R** matrix is used to estimate the various matrices used in the common factor model (as notated in equations three and four) the quality of these matrices constitutes the metaphorical foundation on which any model is built thereafter (Jöreskog, 1994; Flora, et al., 2012; Holgado-Tello, et al., 2008). All EFA and CFA models were thus estimated from polychoric **R** matrices.

4.1.3. Univariate and bivariate frequency distributions. The linear relationships between observed variables necessary for EFA and CFA modeling techniques may exist between variables lacking univariate normality, however, as models are generated from sample covariance (**S**), Pearson or polychoric (**R**) matrices, the distributional assumptions of those techniques must be observed (Flora, et al., 2012). As all models in the present research were estimated from polychoric **R** matrices, the assumption of bivariate normality was relevant. The polychoric correlation is robust to violations of underlying bivariate normality, however the chi-squared tests used to assess the assumption are very sensitive (Jöreskog, 2005; Uebersax2017b). Bivariate normality is typically tested with a Pearson goodness-of-fit (χ^2) or likelihood ratio chi-squared test (G^2), available in functions such as *polycor::polychor* (Bishop, Fienberg, & Holland, 1975; Fox, 2017; Uebersax, 2017a). Univariate frequency distributions were inspected in each subsample by examination of histograms, examples of which are presented in Figure 4. These positively skewed univariate distributions were fairly representative of the overall trend observed in the item-level data. Histograms of the 72 variables analysed in the *calibration* sample and the 21 variables analysed in the *validation* sample are available in Appendices M and N. As described in Section 4.1.2. polychoric correlations outperform Pearson correlations when deviations from univariate normality such as skewness are present, especially when samples are larger than $N = 200$ (Flora, et al., 2012). As all scale data was classed as ordinal, univariate descriptive statistics such as the mean and standard deviation are not meaningful and are thus not presented (Jöreskog, 1994).

4.1.4. Treatment of missing responses and zero cells. Although the 72 items (observed variables) under analysis in the present study contained no missing responses, when examining bivariate relationships between ordinal variables one can encounter “zero cells” which become problematic when computing polychoric correlations. For example, it is

possible that no participant has chosen a score of "1" on variable *x* and a score of "3" on variable *y*, thus leaving an empty or "zero value" cell (Flora, et al., 2012). The treatment of zero cells by available software varies and there is evidence that the choices made regarding these zero values is not inconsequential (Günther & Höfler, 2006; Savalei, 2011). Corrections involve placing a value of 0.5 in the zero value cell, leaving it empty (a zero value), or placing some nominal value such as 0.01 in the cell. Larger sample sizes can mitigate the presence of zero values (Flora, et al., 2012). The "0.5 correction" was applied in the present research and will be discussed in more detail when reporting related results.

4.1.5. Sample size. Gorsuch (1997a) related sample size to the strength of correlation necessary for a common factor to be discernable from surrounding error variance. While no absolute threshold recommendations for minimum sample size are possible, both EFA and CFA are typically regarded as large sample techniques (de Winter, Dodou, & Wieringa, 2009; MacCallum, Widaman, Zhang, & Hong, 1999; Tabachnick & Fidell, 2013). Early EFA guidelines of observation to variable ratios (N/p) have fallen away as computing capability and an understanding of model accuracy has increased, and what is left is a more nuanced and complex picture (de Winter, et al., 2009; MacCallum, et al., 1999). For example, MacCallum, Widaman, Zhang and Hong (1999) provide a theoretical framework within which to understand the relationship between sample size and factor recovery in EFA, positing that multiple parameters contribute to model accuracy. Improvements in accuracy are observed with increases in sample size, communality values, and number of observed variables loading onto a common factor (p/ξ) (MacCallum, et al., 1999). Although larger samples ($N > 200$) are advantageous in certain situations (e.g. low h^2 (communality values), lower λ (factor loadings), low p (observed variables) and high ξ (latent variables)), samples as small as $N = 50$ have been shown to be adequate when λ is high, ξ are low and p is high (MacCallum, et al., 1999). Data possessing the latter qualities are not typical of the behavioural sciences, but do occur in other fields. CFA modeling, too, has had early absolute and observation-based sample size recommendations, for example, a minimum sample size of $(p + 1)(p + 2)/2$, where p is the number of observed variables, was recommended by Jöreskog and Sörbom (1996, in Li, 2016). In CFA analysis, samples below $N = 200$ are considered small, $N = 500$ medium and $N = 1000$ large (Li, 2016). While CFA is typically considered a large sample technique, a systematic review of 194 psychology studies from 1998 to 2006, containing 1,409 CFA models, revealed a median sample size of 389 in practice (Jackson, Gillaspy, Purc-Stephenson, 2009).

In addition to these considerations, the performance of estimators under different sample sizes must be considered. In the case of EFA models estimated from ordinal data, estimator performance in differing sample sizes has been examined. For example, Lee, Zhang, and Edwards (2012) demonstrated in a simulation study that the unweighted least squares (ULS) estimation algorithm performed adequately in moderately large sample sizes (defined in this case as $N > 228$). Diagonally weighted least squares (DWLS), the standard estimator used by *lavaan* in CFA modelling when data is ordinal, is not without sample size-related weaknesses. For example, when sample sizes are small, standard errors tend to be large and interfactor correlations moderately overestimated (Li, 2016). Sample sizes of $N > 300$ have been suggested as sufficient for convergence using DWLS (Moshagen & Musch, 2014). Heeding the recommendations outlined above, the *calibration* and *validation* subsample sizes ($N = 310$) were considered adequate for analysis.

4.1.6. Model residual values. As described in Section 4.1. model residual values can be understood in terms of Cudeck and Henly's (1991) model as *sample discrepancy* (Bollen & Arminger, 1991). The term refers to the difference between the estimated **P** (population) and observed **R** (sample) correlation matrices (i.e. $\mathbf{R}^* = \mathbf{R} - \mathbf{\Lambda}'\mathbf{\Lambda}$, where $\mathbf{R}^*$ is the residual correlation matrix and **R** the sample matrix)[2]. The standardised values in the residual correlation matrix ($\mathbf{R}^*$) are assumed to be random and exhibit a "standard normal" distribution, with no discernable underlying pattern of influence. This assumption can be tested in a variety of ways, for example, by calculating the proportion of residuals with absolute values > 1.96 (Field, Miles, & Field, 2012). If more than 5% of the absolute residual values exceed this value, as they should not if the distribution is "standard normal", then the distribution may be considered problematic. The values of the residual matrix ($\mathbf{R}^*$) were systematically examined in this manner throughout the analyses to follow, with reference to the expected properties of the standard normal distribution. Histograms of the residual values were also examined and these are reported in full with the model results. The residual values may also be interpreted as an indicator of the accuracy of model fit to a sample. For example, the mean value of the residuals can be examined by calculating the standardised root mean square of the residuals, a value of zero indicating an excellent model fit (SRMR; Hu & Bentler, 1999; Jöreskog & Sörbom, 1981). Fit indices and their recommended interpretation are discussed in greater detail and context in Sections 4.2.6. and 4.5.4.

[2] Notation used by *psych::factor.residuals* (Revelle, 2017a)

4.2. Exploratory Factor Analysis: Methodological Choices

The following sections provide an overview of how the EFA models were created, how these choices were justified and how the results were interpreted.

4.2.1. Choice of estimator. Beyond the accuracy with which the Pearson versus polychoric correlation techniques are able to reproduce population parameters, as described in Section 4.1.2., the choice of estimation algorithm can impact model accuracy. Ordinal data is analysed with distribution-free estimation algorithms appropriate for the analysis of this classification of data, such as the unweighted least-squares (ULS) or diagonal least-weighted squares (DLWS) algorithms. EFA model parameters were estimated in an iterative manner using the ULS algorithm, as recommended by Flora, et al. (2012) and Forero, Maydeu-Olivares and Gallardo-Pujol (2009). ULS and DLWS have been observed to perform fairly equally, however, *psych::fa* did not offer DWLS at the time of writing, which influenced the decision to opt for ULS (Forero, Maydeu-Olivares & Gallardo-Pujol, 2009; Revelle, 2017a). Estimation was based on analyses of the polychoric **R** matrix in all models. Polychoric **R** matrices were calculated using quick two-step ML estimation with the "0.5 correction" for zero cells described in Section 4.1.4. (Dragstow, 1988; Olsson, 1979). **R** matrices were also screened with the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy and Bartlett's test of sphericity prior to model estimation (Field, et al., 2012). The KMO statistic is calculated by comparing the correlation and partial correlation matrices, falling between 0 and 1, with values between .80 and .90 classed as a "great" and above .90 as "superb" (Field, et al., 2012; Hutchenson & Sofroniou, 1999). Bartlett's test examines to what extent (polychoric) **R** resembles an identity matrix, a matrix of uncorrelated variables, by means of a χ^2 test (Field, et al., 2012). A significant test indicates that **R** does not resemble an identity matrix.

4.2.2. Number of common factors. There is no single approach available to researchers that can guarantee the optimal number of common factors (*r*) are chosen when specifying an EFA model (Preacher, Zhang, Kim, & Mels, 2013). Instead multiple tools, such as Horn's (1965) parallel analysis, Velicer's (1976) minimum average partial (MAP), the Very Simple Structure (VSS) indices (Revelle & Rocklin, 1979), the examination of scree plots (Cattell, 1966) and eigenvalue thresholds (Kaiser, 1970; Jolliffe, 1972; 1986), and the use of fit indices can be used to make these choices (Preacher, et al., 2013). While any method has limitations, Kaiser (1970) and Jolliffe (1972; 1986)'s approaches to common factor selection have been critiqued for being arbitrary cut-off points (i.e. a factor with an eigenvalue fractionally below the threshold is excluded) and interpretation of Cattell's (1966)

scree plot or the patterns produced by varying values of *r* can be subjective and misleading because judgement is left to the researcher (Gorsuch, 2015; Velicer, 1976). Researchers, viewing identical data, may see different patterns and attribute meaning or importance to those patterns in different ways.

Horn (1965) pioneered a simulation-based solution in which the eigenvectors of a sample under analysis are compared to those of a randomly generated sample of equal size (Gorsuch, 1997a; Kaiser, 1970). As covariance exists even in random data, only common factors which exceed this surrounding error variance should be considered relevant (Gorsuch, 1997a). This procedure has become known as parallel analysis and remains widely used (Dinno, 2009). Parallel analyses were conducted with *psych::fa.parallel*, which provides a scree plot comparing actual and simulated data (Revelle, 2017b). As the common factor model assumes unique factor/error variance (δ), the same method is applied in parallel analyses, i.e. placing communality values on the mean of the **R** matrix. This approach can be controversial as it sometimes results in the selection of more factors than if no error variance were assumed, as is the approach in a principal components analysis (Revelle, 2017b). Parallel analyses were thus run with both methods, placing communality values on the mean of the **R** matrix, or without replacing those values (i.e. a PCA). In some instances the two methods led to contrasting results. All suggested *r* values are reported for each proposed model in Table 3.

Velicer's (1976) minimum average partial (MAP) suggests a methodology for selecting an appropriate interpretable *r* whereby a matrix of partial correlations is considered, and *r* is at a maximum when the average squared partial correlation reaches a minimum value. This statistic is provided as part of the *psych::vss* function (Revelle, 2017a). Revelle and Rocklin's (1979) very simple structure (VSS) indices apply a goodness of fit test to try to answer the question of the ideal value of *r* (Revelle, 2017c). Research suggests that this statistic works well when data are not very factorially complex, that is with complexity indices (*c*) of no more than two (Hofmannn, 1978; Revelle, 2017c). The VSS operationalises the tendency of researchers to interpret factor output by comparing **R** with a correlation matrix reproduced by a simplified version of $\mathbf{\Lambda}'\mathbf{\Lambda}$, which is composed of only the greatest absolute factor loadings (Revelle, 2017c). More recently, Preacher, Zhang, Kim and Mels (2013) posited that the selection of factors in EFA is essentially a question of model selection, although it is rarely approached in this manner. Simulation studies have clarified which fit indices are more helpful for which goals, for example, the best fitting *r* versus the

most replicable *r* (Cudeck & Henly, 1991; Preacher, et al., 2013). To this end Preacher, et al. (2013) suggest examining the values of the root mean square error of approximation (RMSEA; Browne & Cudeck, 1992), RMSEA lower bound confidence interval (RMSEA.LB) (Preacher, et al., 2013), Bayesian Information Criterion (BIC; Schwarz, 1978) and the SRMR (Hu & Bentler, 1999). Fit indices and their recommended interpretation are discussed in greater detail and context in Sections 4.2.6. and 4.5.4.

4.2.3. Rotation method. An oblique rotation method was chosen (Promax) as recommended by Gorsuch (2015). An oblique rotation method, i.e. a rotation method that allows first-order latent variables to correlate with one other, is essential to facilitate extension analysis and reveal potential higher order latent variable structures, as well as to avoid the distortions that orthogonal rotations can generate by limiting correlation between factors (Gorsuch, 1997a). Gorsuch (1997a) stresses that even when using oblique rotations one may find that factors do not correlate – they are simply not precluded mathematically from doing so. The pattern matrix was rotated to simple structure in each instance and the factor loadings (regression weights) examined. The rotated solution of the structure matrix (where factor loadings are correlation coefficients) was also examined in each instance, as recommended by Graham, Guthrie, and Thompson (2003). Whenever rotation techniques are used, questions of "simple structure bias" against the presence of higher order factors must be considered. The simple structure bias arises directly from the use of rotation techniques. Gorsuch (1997a) describes these techniques as working well, "perhaps too well" (p. 546), whereby items expected to measure a single latent variable can produce a simple factorial structure as a function of the rotation technique. This ability of the rotation techniques to clarify structure would seem in contrast to the desire for a simple, parsimonious factor solution, but as Gorsuch (1997a) also stresses, limiting the number of factors extracted can distort a solution. Heeding this advice, parsimony and a simple solution were sought through extension analysis rather than by attempting to reduce first-order factors.

4.2.4. Approach to item analysis. Items with communalities (h^2) below .60 were first excluded in order to reduce the unique factor variance in the model (Hinkin, 1998; Stevens, 2009). Communality values above .60 (MacCallum, et al. 1999) or .70 (Gorsuch, 1983) have been categorised as "high" in previous literature. MacCallum, et al. (1999) observed that high communality values play a critical role in mitigating the effects of smaller sample sizes, and this was the rationale for the .60 value threshold. Coefficient values of .40 or greater in the standardised pattern matrix were considered relevant, as is common in published EFA

research and supported by several authors (Field, 2012; Gorsuch, 1997a; Henson & Roberts, 2006). This threshold value is categorised as between moderate and weak (in de Winter, et al., 2009). A recommended lower limit of three significantly loading items per latent variable was applied in order to eliminate trivial common factors (Gorsuch, 1997a; Hinkin, 1998).

4.2.5. Approach to extension analysis. It is important not only to establish whether or not a higher-order factor structure is present, but to be able to compare the respective ability of first- and higher-order factors, or grouped and general factors to accurately reproduce **R** (Gorsuch, 2015). Several approaches to extension analysis in EFA exist in the literature and/or are supported by *psych* (Revelle, 2017a). These approaches were initially developed to allow researchers to add new variables to existing EFA solutions (Dwyer, 1937; Mosier, 1938; Horn, 1973). Gorsuch later adapted these earlier approaches, proposing a procedure of his own Gorsuch (1997a; 1997b). The starting point of the Gorsuch procedure is to conduct EFA on the factor correlation matrix (**Φ)** of the simple solution (1997b; 2015). In the present research, this step is performed in order to identify potential higher order factors. The models generated are then tested on the *validation* sample using CFA. This choice was taken as the full Gorsuch (1997b) extension analysis does not appear to be widely applied in the literature. Brunner, Nagy, and Wilhelm (2012) indicate that the models generated by exploratory extension analysis can be tested against one another using Confirmatory Factor Analytic techniques, and this approach is followed in the present research.

4.2.6. Fit statistics. The fundamental test of a model is the distance between **Σ** and **S**, or **P** and **R**. This is tested with a chi-square (χ^2_{model}) test, a significant result indicating that that distance is large and the fit poor (Hu & Bentler, 1999). The popularity of the χ^2_{model} statistic in CFA (see Jackson, et al., 2009) is matched only by the criticism levelled at its fallibility as a meaningful test (Mulaik, et al., 1989). The χ^2 statistic is sensitive to sample size, leading to significant but potentially meaningless results in larger populations ($N > 200$). For models with $N > 400$, the χ^2 statistic is almost always statistically significant (Kenny, 2017). In order to mitigate this weakness of the test, the χ^2_{model} statistic is sometimes reported as a χ^2/df ratio, where a value lower than 2 may indicate good fit (Tabachnick & Fidell, 2013), although this practice is not without criticism (Kenny, 2017). The root mean squared error of approximation (RMSEA) and Tucker-Lewis Index (TLI), described below, are both based on the χ^2/df ratio (Kenny, 2017). A range of fit indices have been developed to supplement the χ^2_{model} test (Hu & Bentler, 1999). As no single fit index can be considered a definitive decision-making tool, the use of multiple fit statistics provides a diversified and

robust assessment of the fit of a model (Jackson, et al., 2009; Tabachnick & Fidell, 2013). Tabachnick and Fidell (2013) divide goodness of fit statistics into three categories: Absolute, incremental (or comparative) and parsimonious measures of fit.

Indices of absolute fit assess the extent to which estimated models are able to reproduce observed data (Hu & Bentler, 1999). In contrast to the χ^2_{model} statistic, absolute fit indices are interpreted along a continuum. For example, the SRMR mentioned in Section 4.1.6 and "Fit" index (= sum of squared $\mathbf{R}^*$ values / sum of squared **R** value) are examples of absolute fit indices. A SRMR value of zero indicates that **P** and **R** are identical, while a value of under .06 is considered an indication of acceptable fit (Hu & Bentler, 1999). The Fit index based upon off-diagonal values compares $\mathbf{R}^*$ and **R**, with a slightly different interpretation. Values again range from 0 to 1 and values above .95 indicate a good fit (Field, et al., 2012). Another widely reported statistic of absolute fit is the root mean squared error of approximation (RMSEA) (Jackson, et al., 2009; Steiger & Lind, 1980). Guidelines for the interpretation of the RMSEA statistic vary and are based on estimation techniques in use, e.g. Hu and Bentler's (1999) popular recommendations for interpretation of fit indices are based on the use of the Maximum Likelihood (ML) estimator (RMSEA > .08 suggests poor fit; 05 < RMSEA < .08 suggests reasonable fit; RMSEA < .05 suggests good fit). As the distribution of the RMSEA is known, it is also possible to report a confidence interval for the statistic, increasing its accuracy (Hu & Bentler, 1999). The χ^2_{model} statistic and absolute fit indices can be understood as measures of *sample discrepancy* in Cudeck and Henly's (1991) framework.

Comparative or incremental fit indices place the estimated model on an abstracted continuum in which the specified model is compared to both the independence (worst possible) and saturated (best possible) models (Hu & Bentler, 1999; Kenny, 2017; Tabachnick & Fidell, 2013). The χ^2_{model} statistic is used in the calculation of these indices and so their value is not independent of the quality of that test choice. In this category are the Comparative Fit Index (CFI) and Non-Normed Fit Index (NNFI), also known as the Tucker-Lewis Index (TLI). The CFI and NNFI/TLI statistics can fall between 0 and 1, and the NNFI/TLI may exceed 1, higher values indicating a better fit (Tabachnick & Fidell, 2013). A threshold of CFI/TLI > .95 or .96 is typically recommended when judging acceptable model fit (Hu & Bentler, 1999). Parsimonious fit indices address the trade-off between fitting a model well to **R**, and the simplicity of a model (i.e. in the index calculations the model is penalized for each new parameter). Grounded in information theory, the Akaike Information Criterion (AIC; Akaike, 1974) is an example of this type of fit index and can be regarded as

an estimate of how well a model is expected to cross-validate to another sample (Browne & Cudeck, 1992). Also in this category are Schwarz's Bayesian Information Criterion (BIC; Schwarz, 1978) and the sample-size adjusted BIC (SABIC; Sclove, 1987), both of which, like the AIC, penalize the addition of model parameters, the former more than the latter (Kenny, 2017). The *psych::fa* and *psych:vss* functions offer both BIC and SABIC indices, but not the AIC (Revelle, 2017a). These indices are not normed to a 0 to 1 scale like the absolute or comparative/incremental fit indices and lower absolute values are better (Revelle, 2017c). The fit indices described in this section are reported for all EFA models and were used as a decision-making tool so that the most appropriate model might be discerned at each stage (iteration) of the EFA process. More fit indices are reported for the EFA analyses than for the CFA analyses of Section 4.5. This is because *psych::fa* provides them, but also to allow for a coherent picture to emerge, i.e. if the calculation of indices reliant on χ^2 and *df* values seem problematic, residual value-based indices such as the SRMR can also be examined. The fit statistics were not applied as threshold values to the EFA models, as they might be to CFA models when determining whether to accept or reject a model. The thresholds chosen for the CFA analyses, as well as the context and aims of their use are described in Section 4.5.4.

4.3. Exploratory Factor Analysis: Obtaining A Simple Structure

The sections to follow describe an iterative EFA process, in which a total of six iterations of EFA resulted in the determination of a simple structure. The analysis began with a pool of 72 items, or observed variables (see Table 2) and ended with a pool of 47 observed variables (see Table 6). In each subsequent iteration, items were excluded from the pool of observed variables because they exhibited either communality values (h^2) or pattern matrix factor loadings (λ) below predetermined thresholds (detailed in Section 4.2.4.). In each iteration of EFA, three models with differing numbers of common factors (*r*), suggested by a variety of methods (see Section 4.2.2. and Table 3) were specified.

These competing models were examined for their ability to reproduce the **R** of the *calibration* sample and the model of best fit was chosen as the basis for a subsequent iteration of EFA. A satisfactory model was reached by the sixth EFA iteration (Model 6b) and the resultant model was hypothesised to adequately fit the *validation* sample (H_1). Finally, an extension EFA was conducted, using the interfactor correlation matrix of Model 6b. The results of the extension analysis produced three potential higher-order models (Models A, B and C) with differing numbers of common factors. These three higher-order models

Table 2

Key to the Item Pool Under Analysis

	Variable	Description
1.	GID_1	When someone criticises my workgroup, it feels like a personal insult
2.	GID_2	I am very interested in what others think about my workgroup
3.	GID_3	When I talk about my workgroup, I usually say 'we' rather than 'they'
4.	GID_4	My workgroup's successes are my successes
5.	GID_5	When someone praises my workgroup, it feels like a personal compliment
6.	GID_6	If a story in the media criticised my workgroup, I would feel embarrassed
7.	GID_7	My employment in this workgroup is a big part of who I am
8.	GID_8	What this workgroup stands for is important to me
9.	GID_9	I share the goals and values of this workgroup
10.	GID_10	My membership of this workgroup is important to me
11.	GID_11	I feel strong ties with my workgroup
12.	AC_1	I would be very happy to spend the rest of my career with this workgroup
13.	AC_2	I enjoy discussing my workgroup with people outside it
14.	AC_3	I really feel as if this workgroup's problems are my own
15.	AC_5	I feel like 'part of the family' in this workgroup
16.	AC_6	I feel 'emotionally attached' to this workgroup
17.	AC_7	This workgroup has a great deal of personal meaning for me
18.	AC_8	I feel a strong sense of belonging to my workgroup
19.	GC_1	I feel a sense of belonging to my workgroup
20.	GC_2	I feel that I am a member of my workgroup
21.	GC_3	I see myself as part of my workgroup
22.	GC_4	I am enthusiastic about my workgroup
23.	GC_5	I am happy to work in this workgroup
24.	GC_6	My workgroup is part of one of the best organisations in the country
25.	SWC_1	I am satisfied with my workgroup
26.	SWC_2	I am satisfied with the way my workgroup functions
27.	SWC_3	I am satisfied with the communication between workgroup members
28.	SWC_4	I am satisfied with the leadership in my workgroup
29.	SWC_5	I am satisfied with the relationship climate within my workgroup
30.	BI_1	My colleagues help me to do a good job
31.	BI_2	My colleagues always pass on important information to me
32.	BI_3	My colleagues do their best to collaborate with me in a proper way
33.	BI_4	The members of my workgroup are quick to defend each other from criticism from outsiders
34.	BI_5	The successes of other members of my workgroup help me achieve my own objectives
35.	BI_6	The members of my workgroup get along together very well
36.	BI_7	Everyone's input is incorporated into most important workgroup decisions

Note. GID = Group Identification; AC = Affective Commitment; GC = Group Cohesion; SWC = Satisfaction with Co-Workers; BI = Behavioural Integration; QSR = Quality of Social Relations; PGI = Perceived Group Inclusion; PE = Psychological Empowerment.

Key to the Item Pool Under Analysis (Continued)

	Variable	Description
37.	BI_8	The members of my workgroup are always ready to cooperate and help each other
38.	BI_9	The members of my workgroup really stick together
39.	QSR_1	Members in my workgroup interact socially outside of work
40.	QSR_2	Members in my workgroup have good personal relationships
41.	QSR_3	Members in my workgroup love to share their personal resources with each other
42.	PGI_1	My workgroup gives me the feeling that I belong
43.	PGI_2	My workgroup gives me the feeling that I am part of this group
44.	PGI_3	My workgroup gives me that feeling that I fit in
45.	PGI_4	My workgroup treats me as an insider
46.	PGI_5	My workgroup likes me
47.	PGI_6	My workgroup appreciates me
48.	PGI_7	My workgroup is pleased with me
49.	PGI_8	My workgroup cares about me
50.	PGI_9	My workgroup allows me to be authentic
51.	PGI_10	My workgroup allows me to be who I am
52.	PGI_11	My workgroup allows me to express my authentic self
53.	PGI_12	My workgroup allows me to present myself the way I am
54.	PGI_13	My workgroup encourages me to be authentic
55.	PGI_14	My workgroup encourages me to be who I am
56.	PGI_15	My workgroup encourages me to express my authentic self
57.	PGI_16	My workgroup encourages me to present myself the way I am
58.	PE_1	I can influence the way work is done in my workgroup
59.	PE_2	I have the authority to make decisions at work
60.	PE_3	I have the authority to work effectively
61.	PE_4	I can influence decisions taken in my workgroup
62.	PE_5	Important responsibilities are part of my job
63.	PE_6	I have the skills and abilities to do my job well
64.	PE_7	I have the competence to work effectively
65.	PE_8	I have the capabilities required to do my job well
66.	PE_9	I can handle the challenges I face at work
67.	PE_10	I can do my work efficiently
68.	PE_11	I am inspired by the goals of my workgroup
69.	PE_12	I am enthusiastic about working toward my workgroup's objectives
70.	PE_13	I am enthusiastic about the contribution my work makes to my workgroup
71.	PE_14	I am inspired by what we are trying to achieve as a workgroup
72.	PE_15	I am keen on our doing well as a workgroup

Note. GID = Group Identification; AC = Affective Commitment; GC = Group Cohesion; SWC = Satisfaction with Co-Workers; BI = Behavioural Integration; QSR = Quality of Social Relations; PGI = Perceived Group Inclusion; PE = Psychological Empowerment.

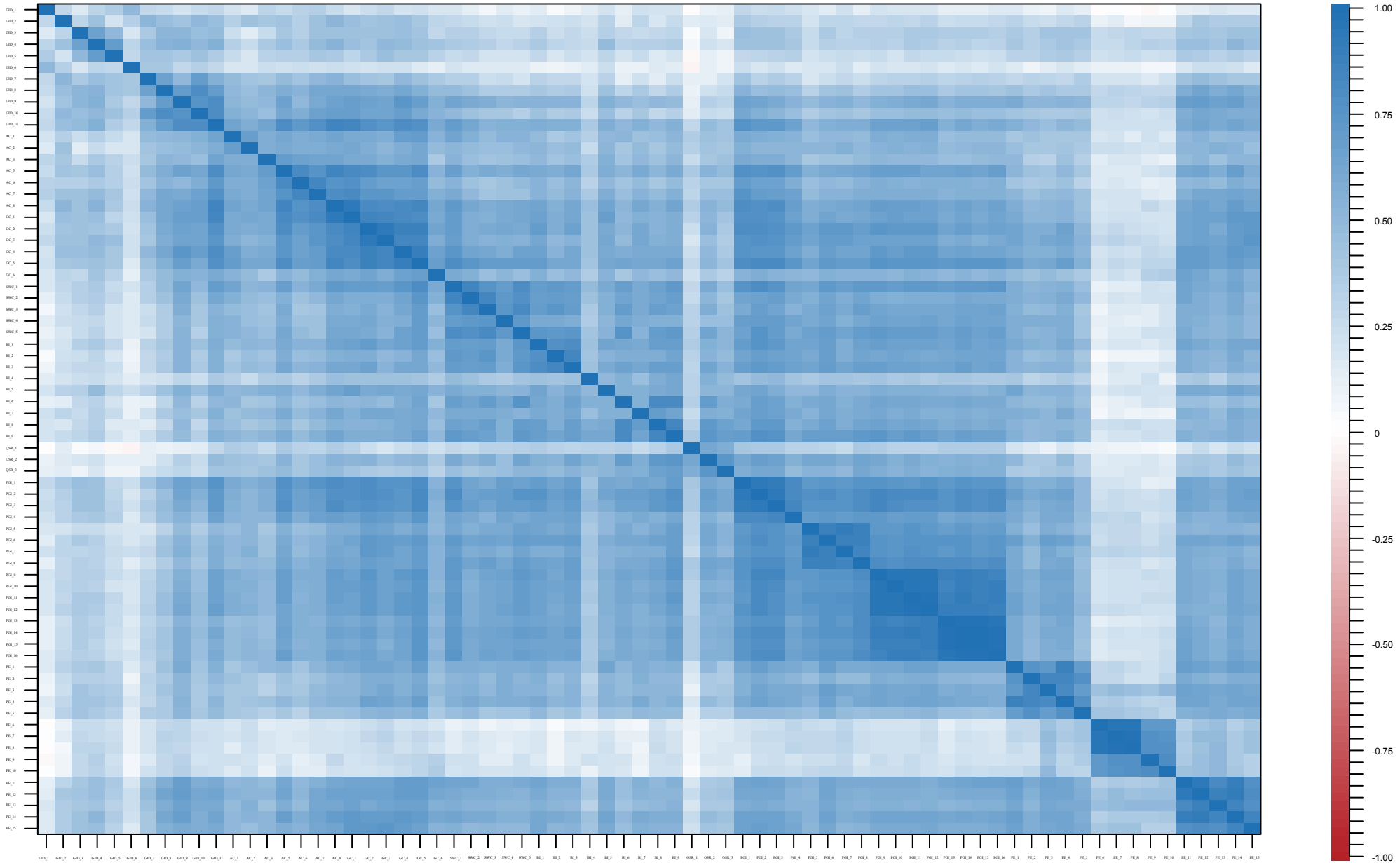

Figure 5. Graphic Representation of the 72 Item Polychoric **R** Matrix (Calibration Sample)

informed four further hypotheses (H_2, H_3, H_4 and H_5) which were tested by CFA on the *validation* sample (reported in Section 4.4.).

The *calibration* subsample (N_1 = 310) satisfied the basic assumptions outlined in Section 4.1. Participants made use of only four of the five possible response options in four of the variables (PE_6; PE_8; PE_9; PE_10) (refer to Appendix M for a histogram of each of the 72 variables under analysis). These missing categories were treated as zero values and thus corrected. As sample size decreases, the likelihood of sparseness in ordinal data increases, however no missing ordinal categories were observed in either the *validation* subsample (N_2 = 310) or full sample (N = 620). A 72-item polychoric **R** was generated with *psych::polychoric*, which formed the basis for all subsequent EFA models. This polychoric **R** is depicted graphically in Figure 5 as a heatplot, where stronger correlations between variables are depicted with darker colours (blue for negative, red for positive).

Table 3

Common Factor Number Choice by Method and Iteration of EFA (Calibration Sample)

	Iteration of first-order EFA						Higher-order EFA
Method	1	2	3	4	5	6	
VSS1	1	1	1	1	1	1	1[c]
VSS2	2	2	2	2	2	2	2[b]
Velicer's (1976) MAP	7[b]	8[a]	8[a]	7[b]	7[b]	7[b]	1[c]
Kaiser's (1970) Criterion	6[c]	5[c]	5[c]	5	5	5	1[c]
Jolliffe's (1972) Criterion	8[a]	6[b]	6[b]	6[c]	6[c]	6[c]	2[b]
Parallel Analysis	7[b]	6[b]	6[b]	6[c]	6[c]	6[c]	2[b]
Parallel Analysis (PCA)	6[c]	6[b]	6[b]	6[c]	6[c]	6[c]	2[b]
Schwarz's (1978) BIC	6[c]	6[b]	6[b]	6[c]	7[b]	7[b]	3[a]
Sample Size Adjusted BIC	8[a]	8[a]	8[a]	8[a]	8[a]	8[a]	3[a]

Note. x[x] = exponents "a", "b' or "c" refer to the naming of models; VSS = very simple structure; MAP = minimum average partial; PCA = Principal Components Analysis; BIC = Bayesian Information Criterion.

4.3.1. Iteration one. The full 72-item pool was assessed before estimating any EFA models, in order to determine an appropriate number of common factors. The suggested number of common factors (r) ranged from one to eight and differed depending on the method used (see Model 1 in Table 3 for a summary). Values relating to the suggested r of the VSS1, VSS2 and MAP statistics are summarised in Table 5, while those relating to the BIC and SABIC statistics are summarised in Table 4. Heeding Gorsuch's (1997a) recommendation that it is better to extract too many factors rather than too few, the one- and

two- factor suggestions were ignored in the determination of a simple structure, i.e. the six iterations of EFA conducted in order to reach a final EFA-derived model. Three models were thus specified, with eight (Model 1a), seven (Model 1b) and six (Model 1c) common factors for comparison. The Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test result indicated that the data was suitable for EFA (see Table 4) and the three models were estimated.

The fit indices for Models 1a, 1b and 1c are summarised in Table 4. While the χ^2_{model} was significant in each case, the absolute fit indices in use demonstrated adequate fit, consistently favouring the eight-factor solution (Model 1a) with marginally lower RMSEA, RMSEA.LB and SRMR values and a higher Fit index value (shared by Model 1b, which demonstrates an identical value). This is consistent with the χ^2/df ratio, which also favoured Model 1a. The index of comparative fit included in the analysis (NNFI, or TLI) was also slightly larger for Model 1a than 1b or 1c. An examination of the two indices of parsimonious fit, the BIC and SABIC, indicated that the SABIC suggested an 8-factor solution, while the BIC favoured the 6-factor solution. Finally, the residual values of the models were examined in order to assess the distributional assumptions described in Section 4.1.6 (presented in Figure 6). Neither of the three models deviated from the standard normal distribution. It was concluded that the distribution of the residual correlation matrix values was random and uninfluenced by any undetected force. Further analysis was thus based on an eight-factor solution (Model 1a) which appeared to demonstrate the most appropriate fit to the data.

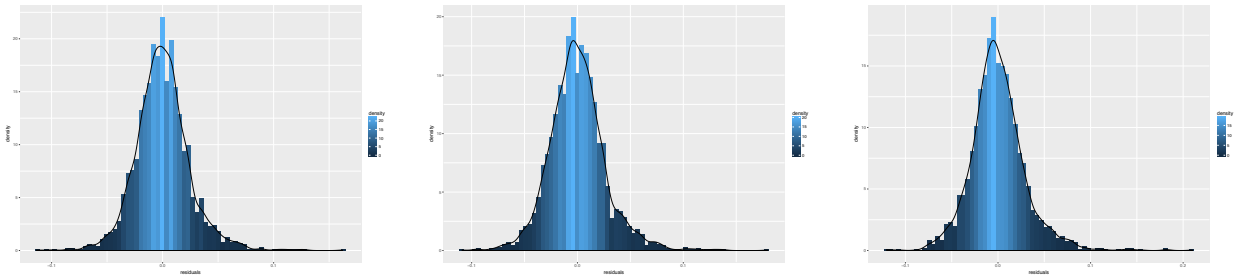

Figure 6. Histograms of Residual Values for Models 1a (Left), 1b (Middle) and 1c (Right)

4.3.2. Iteration two. In the eight-factor solution (Model 1a) 16 items had communalities below .60 and were thus removed from further analysis (GID_1: h^2 = .315; GID_2: h^2 = .346; GID_3: h^2 = .434; GID_5: h^2 = .441; GID_6: h^2 = .302; GID_7: h^2 = .570; AC_1: h^2 = .494; AC_2: h^2 = .484; AC_3: h^2 = .474; GC_6: h^2 = .465; BI_2: h^2 = .578; BI_4: h^2 = .386; BI_5: h^2 = .518; BI_7: h^2 = .525; QSR_2 = .133; QSR_2 = .582). In order to determine the appropriate number of common factors to specify, the remaining 56-item pool

Table 4

Fit Statistics of the Simple Structure Models (Calibration Sample)

Model		χ^2_{model}	*df*	*p*	χ^2/df	RMSEA	90% CI Low	90% CI High	SRMR	Fit	NNFI	SABIC	BIC
	a	3019.890	2008	<.001	1.503	.0464	.0374	NA	.0244	.997	.9266	-2131.528	-8499.147
1	b	3325.962	2073	<.001	1.604	.0500	.0414	NA	.0266	.997	.9122	-1991.178	-8565.952
	c	1324.632	2139	<.001	1.694	.0530	.0447	NA	.0294	.996	.8994	-1861.795	-8645.896
	a	1515.719	1120	<.001	1.353	.0391	.0293	NA	.0182	.999	.9642	-1357.025	-4909.242
2	b	1989.316	1219	<.001	1.631	.0498	.0416	NA	.0234	.998	.9362	-1137.357	-5003.565
	c	2429.783	1270	<.001	1.910	.0587	.0510	NA	.0280	.997	.9083	-830.703	-4858.664
	a	1283.060	938	<.001	1.367	.0394	.0297	NA	.0173	.999	.9663	-1122.863	-4097.845
3	b	1709.733	1029	<.001	1.661	.0506	.0424	NA	.0223	.998	.9398	-929.600	-4193.200
	c	2152.910	1076	<.001	2.000	.0610	.0534	NA	.0276	.997	.9091	-606.975	-4019.642
	a	1239.284	895	<.001	1.384	.0401	.0304	NA	.0173	.999	.9657	-1056.345	-3894.948
4	b	1415.807	939	<.001	1.507	.0450	.0362	NA	.0195	.999	.9548	-992.680	-3970.834
	c	1666.990	984	<.001	1.694	.0516	.0435	NA	.0224	.998	.9383	.856.920	-3977.797
	a	1056.627	772	<.001	1.368	.0392	.0292	.0396	.0164	.999	.9690	-923.514	-3372.007
5	b	1201.421	813	<.001	1.477	.0436	.0345	.0439	.0185	.999	.9599	-883.882	-3462.412
	c	1448.735	855	<.001	1.694	.0514	.0432	.0516	.0219	.998	.9419	-744.296	-3456.034
	a	979.939	733	<.001	1.336	.0377	.0274	.0383	.0159	.999	.9724	-900.168	-3224.968
6	b	1123.758	773	<.001	1.453	.0426	.0333	.0431	.0181	.999	.9629	-858.948	-3310.613
	c	1370.281	814	<.001	1.683	.0510	.0427	.0513	.0217	.998	.9443	-717.587	-3299.289

Note. $N_1 = 310$; χ^2_{model} = model chi-square statistic; *df* = degrees of freedom; *p* = probability value; RMSEA = root mean square error of approximation; CI = confidence interval of the RMSEA statistic; NNFI = Non-Normed Fit Index (Tucker Lewis Fit Index); BIC = Bayesian Information Criterion; RMSR = root mean square of the residuals; Fit = fit based upon off diagonal values.

Table 5

Various Statistics Informing Each Iteration of EFA Model Selection

Model		Number of items	Velicer's MAP	VSS1	VSS2	KMO	χ^2	*df*	*p*	Cumulative variance
	a									64.6%
1	b	72	.008	.945	.970	.971	20484.268	2556	<.001	63.4%
	c									60.0%
	a									70.6%
2	b	56	.008	.952	.977	.975	17035.166	1540	<.001	68.3%
	c									66.6%
	a									72.1%
3	b	52	.008	.952	.834	.976	16115.251	1326	<.001	69.8%
	c									68.0%
	a									72.4%
4	b	51	.009	.952	.860	.975	15846.097	1275	<.001	71.3%
	c									70.0%
	a									72.8%
5	b	48	.009	.947	.860	.974	14811.146	1128	<.001	71.8%
	c									70.4%
	a									73.2%
6	b	47	.009	.948	.866	.974	14544.719	1081	<.001	72.2%
	c									70.8%

Note. N_1 = 310; Velicer's MAP = Velicer's Minimum Average Partial; VSS = Very Simple Solution; KMO = Kaiser Meyer Olkin; χ^2 = chi square for Bartlett's test of sphericity; *df* = degrees of freedom; *p* = probability value. All solutions estimated with ULS and rotated with Promax.

was assessed in the same manner as Model 1. Both Velicer's (1976) MAP and the SABIC (Sclove, 1987) suggested an eight-factor model would be appropriate to the data, while Schwarz's (1978) BIC, Jolliffe's (1972) criterion and Horn's (1965) parallel analysis suggested a six-factor model (Table 3). The VSS (Revelle & Rocklin, 1979) statistics and Kaiser's (1970) criterion suggested one-, two- and five-factor solutions, respectively.

Three models were specified, with eight (Model 2a), six (Model 2b) and five (Model 2c) common factors, respectively. While only a single method suggested a five-factor solution, Model 2c was included so that it could be compared to the other solutions and eliminated as a plausible option if it was not as good a fit. The χ^2_{model} was significant in each case and fit indices again consistently favoured the eight-factor solution (Model 2a), with the exception of the BIC, which favoured the six-factor solution (Model 2b). Residual values of the models were examined to assess distributional assumptions, again concluding that each distribution was normal and thus unproblematic. Histograms of the residual values for the

second, third, fourth and fifth iteration of EFA analysis are presented in Appendix O. Further analysis was based on the eight-factor solution (Model 2a).

4.3.3. Iteration three. As four items in the eight-factor solution (Model 2a) had h^2 values below .60 they were removed from further analysis (GID_4: h^2 = .412; GID_8: h^2 = .577; BI_3: h^2 = .594; QSR_3: h^2 = .491). The remaining 52-item pool was assessed for the appropriate number of common factors in the same manner as the previous models. The VSS (Revelle & Rocklin, 1979) statistics again suggested one- and two- factor solutions, suggestions which remained consistent throughout the EFA analyses (see Table 3). Kaiser's (1970) criterion suggested a five-factor solution, while the remaining common factor selection methods suggested six- or eight- factor solutions, as was the case in the previous EFA iteration (Model 2, Section 4.3.2.). Three models were again specified, with eight (Model 3a), six (Model 3b) and five (Model 3c) common factors. The χ^2_{model} was again significant in each case. The fit indices consistently favoured the eight-factor solution (Model 3a), with the exception of the BIC (Schwarz, 1978) which again favoured the 6-factor solution (Model 3b). The distributional assumptions of the residual correlation matrix values of the three models were examined visually and by calculating the percentage of values expected to fall under different parts of the standard normal distribution (Appendix O). These assumptions were satisfied in each case. Further analysis was thus based on the eight-factor solution (Model 3a).

4.3.4. Iteration four. A single item now had a communality value of below .60 and was excluded from further analysis (BI_1: h^2 = .586). The remaining 51-item pool was assessed for an appropriate number of common factors. While the VSS (Revelle & Rocklin, 1979) statistics and Kaiser's criterion (1970) suggested one-, two- and five-factor solutions, respectively, the SABIC (Sclove, 1987) suggested an eight-factor model, Velicer's (1976) MAP suggested a seven-factor model, and Schwarz's (1978) BIC, Jolliffe's (1972) criterion and Horn's (1965) parallel analysis suggested a six-factor model (Table 3). As a five-factor solution had been the least successful fit in the previous two iterations of EFA, only three models were generated (i.e. forgoing the five-factor solution) with eight (Model 4a), seven (Model 4b) and six common factors (Model 4c), respectively. Each χ^2_{model} was again significant, however, the fit indices were adequate and pointed to an eight-factor solution (Model 4a), with the exception as before of the BIC, which suggested a six-factor solution (Model 4c). Examination of the residual values of each model revealed no departures from the expected standard normal distribution (Appendix O). Further analysis was thus based on the eight-factor solution (Model 4a).

4.3.5. Iteration five. The first four iterations of EFA had thus strongly supported eight-factor solutions. As all items in the remaining 51-item pool possessed communality values above the .60 threshold in use, the standardised coefficients of the pattern matrix were considered. Three items had pattern matrix loadings (λ) of less than .40, the threshold value adopted for the purposes of EFA analyses (Section 4.2.4.) (GID_9: λ = .378; GC_5: λ = .385; PGI_4: λ = .384). These three items were removed from further analysis and, as in the previous four EFA iterations, the remaining 48-item pool was assessed to determine an appropriate number of common factors. The SABIC (Sclove, 1987) again suggested an eight-factor model, Velicer's (1976) MAP and Schwarz's (1978) BIC suggested a seven-factor solution, Jolliffe's (1972) criterion and Horn's (1965) parallel analysis suggested a six-factor solution. Kaiser's criterion (1970) suggested a five-factor solution, while the VSS (Revelle & Rocklin, 1979) statistics suggested one- and two-factor solutions.

Based on the performance of the previous four EFA iterations, three models were again generated, with eight (Model 5a), seven (Model 5b) and six common factors (Model 5c), respectively. Each χ^2_{model} was again significant. Fit indices, with the exception of the BIC, indicated that the eight-factor solution (Model 5a) reproduced **R** with the greatest accuracy. As in the previous EFA models, no deviations from the standard normal distribution were observed in the residual correlation matrix values (Appendix O). The eight-factor solution (Model 5a) was ultimately chosen as the basis for further analysis, exhibiting slightly better fit statistics.

4.3.6. Iteration six. In each of the three models specified in the fifth EFA iteration, a single item fell below the communality value threshold of .60 (in Model 5a, GID_10: h^2 = .546). This item was excluded from further analysis and the remaining 47-item pool was assessed. As in each previous EFA iteration, the Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test result indicated that the data was suitable for EFA (Table 5). The number of common factors recommended by the methods listed in Table 3 were no different to the fifth iteration of analysis on the 48-item pool. Thus, three models were again estimated, with eight (Model 6a), seven (Model 6b) and six (Model 6c) common factors. The χ^2_{model} statistic was significant for each model, as before, however the fit indices for each model were adequate.

Although Model 6a demonstrated a better fit than 6b or 6c when looking at the absolute and comparative fit indices, Model 6b had a marginally lower BIC value. Further, the eighth factor in Model 6a demonstrated no significant pattern matrix coefficients greater than .40. On this basis, the seven-factor solution (Model 6b) was chosen as the most appropriate

Table 6

Model 6b: Standardised Loadings (Pattern or Λ Matrix) Based Upon Correlation Matrix

	First-Order Factor									
	1	2	3	4	5	6	7	h^2	u^2	c
GID_11	**0.810**	0.006	0.089	0.053	0.086	-0.014	-0.161	0.670	0.330	1.140
AC_5	**0.833**	0.095	0.169	-0.153	0.018	0.004	-0.139	0.712	0.288	1.240
AC_6	**1.017**	0.139	-0.077	-0.139	0.010	-0.095	-0.164	0.675	0.325	1.160
AC_7	**0.951**	-0.011	-0.093	-0.025	-0.032	0.049	-0.102	0.675	0.325	1.050
AC_8	**0.846**	-0.002	0.082	-0.077	-0.007	0.032	0.004	0.766	0.234	1.040
GC_1	**0.855**	-0.013	-0.043	-0.005	-0.047	0.132	-0.028	0.763	0.237	1.060
GC_2	**0.661**	-0.008	-0.089	0.171	-0.004	-0.010	0.169	0.706	0.294	1.310
GC_3	**0.623**	-0.136	-0.096	0.199	0.017	0.038	0.224	0.667	0.333	1.660
GC_4	**0.550**	0.006	0.114	0.078	-0.026	0.178	0.004	0.682	0.318	1.350
SWC_1	0.233	0.098	**0.544**	0.005	-0.030	0.076	-0.080	0.633	0.367	1.530
SWC_2	0.022	-0.101	**0.792**	0.069	-0.040	0.175	-0.132	0.632	0.368	1.210
SWC_3	-0.144	0.012	**0.839**	-0.010	-0.074	0.193	-0.044	0.676	0.324	1.190
SWC_4	0.054	0.150	**0.503**	0.136	-0.093	0.041	0.014	0.611	0.389	1.460
SWC_5	0.029	0.060	**0.812**	-0.003	0.023	-0.054	-0.006	0.714	0.286	1.020
BI_6	-0.015	0.001	**0.809**	0.046	0.066	-0.157	0.055	0.632	0.368	1.110
BI_8	-0.007	-0.044	**0.747**	0.010	0.115	-0.085	0.123	0.613	0.387	1.140
BI_9	0.104	0.055	**0.640**	-0.050	0.051	-0.074	0.144	0.647	0.353	1.230
PGI_1	**0.524**	0.050	0.154	0.049	-0.099	-0.002	0.178	0.698	0.302	1.540
PGI_2	**0.400**	0.084	0.242	0.073	-0.012	-0.069	0.227	0.738	0.262	2.600
PGI_3	**0.420**	0.113	0.258	0.002	-0.001	-0.057	0.208	0.735	0.265	2.430
PGI_5	-0.102	0.116	0.102	-0.137	0.009	0.004	**0.858**	0.742	0.258	1.150
PGI_6	-0.115	0.115	0.095	0.060	-0.097	0.170	**0.674**	0.753	0.247	1.360
PGI_7	-0.017	0.193	0.016	-0.132	0.034	0.040	**0.758**	0.726	0.274	1.210
PGI_8	-0.040	0.281	0.182	-0.043	-0.039	0.003	**0.521**	0.684	0.316	1.860
PGI_9	0.179	**0.635**	0.040	0.081	0.045	-0.115	0.082	0.757	0.243	1.320
PGI_10	0.132	**0.708**	-0.051	0.053	0.031	-0.055	0.125	0.776	0.224	1.170
PGI_11	0.110	**0.665**	0.002	0.092	0.043	-0.100	0.141	0.772	0.228	1.250
PGI_12	0.139	**0.660**	-0.050	0.142	0.042	-0.119	0.138	0.772	0.228	1.380
PGI_13	-0.032	**0.891**	-0.011	0.005	-0.057	0.109	-0.040	0.788	0.212	1.050
PGI_14	0.023	**0.832**	0.072	-0.074	0.003	0.101	-0.025	0.812	0.188	1.060
PGI_15	-0.031	**0.935**	0.018	0.008	-0.021	0.102	-0.119	0.817	0.183	1.060
PGI_16	0.024	**0.892**	0.012	-0.063	-0.004	0.082	-0.023	0.829	0.171	1.030
PE_1	-0.036	0.071	0.074	**0.725**	-0.098	0.125	-0.033	0.681	0.319	1.150
PE_2	0.047	0.051	0.061	**1.045**	-0.071	-0.144	-0.209	0.787	0.213	1.150
PE_3	-0.079	0.146	0.006	**0.678**	0.174	0.009	0.012	0.697	0.303	1.260
PE_4	-0.054	0.040	0.087	**0.872**	0.003	-0.017	-0.040	0.776	0.224	1.040
PE_5	-0.056	-0.112	-0.025	**0.841**	0.109	0.060	-0.008	0.677	0.323	1.090
PE_6	0.022	-0.079	-0.126	0.108	**0.796**	-0.009	0.106	0.738	0.262	1.150
PE_7	0.017	-0.053	-0.039	0.056	**0.847**	0.017	0.036	0.783	0.217	1.030
PE_8	0.035	-0.044	-0.002	-0.054	**0.888**	0.009	0.048	0.787	0.213	1.020
PE_9	-0.026	0.027	0.123	-0.054	**0.835**	0.047	-0.103	0.670	0.330	1.090
PE_10	-0.072	0.140	0.082	-0.047	**0.824**	0.057	-0.115	0.670	0.330	1.150
PE_11	-0.012	0.104	0.097	0.032	0.001	**0.740**	-0.008	0.772	0.228	1.080
PE_12	0.132	0.043	-0.006	-0.024	0.091	**0.728**	0.021	0.791	0.209	1.110
PE_13	0.088	-0.039	0.014	-0.073	0.156	**0.707**	0.122	0.750	0.250	1.220
PE_14	0.156	0.068	0.006	0.012	-0.012	**0.713**	0.032	0.807	0.193	1.120
PE_15	0.251	-0.022	-0.119	0.215	0.090	**0.457**	0.046	0.664	0.336	2.360

Note. h^2 = communality values; u^2 = unique values; c = Hofmann's (1978) index of complexity; GID = Group Identification; AC = Affective Commitment; GC = Group Cohesion; GS = Satisfaction with Co-Workers; BI = Behavioural Integration; PGI = Perceived Group Inclusion; PE = Psychological Empowerment.
Pattern matrix coefficients > .4 are presented in bold.

representation of a parsimonious first-order solution, the basis for extension analyses. All h^2 values were > .60 and λ values were > .40. The *sample discrepancy*, visually represented by histograms of the residual values (Figure 7), appeared to be small and randomly distributed, satisfying the assumptions of the model (Cudeck & Henly, 1991). The analysis thus justified the proposition of the following hypothesis (Haig, 2005a):

H_1: EFA Model 6b adequately reproduces **R** of the *validation* sample.

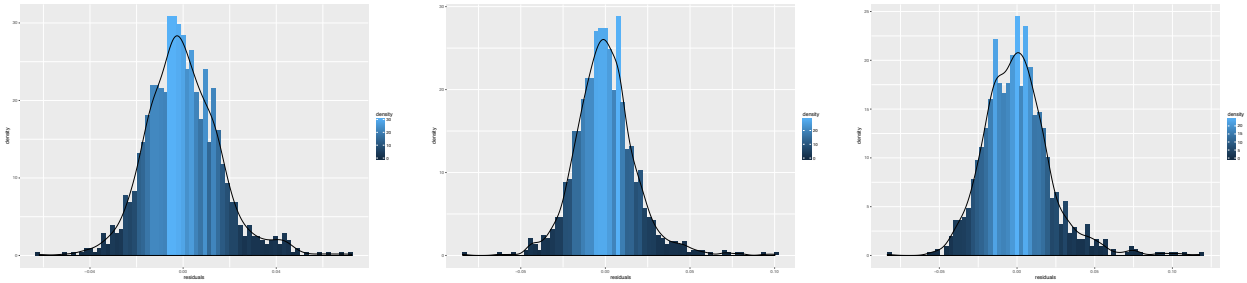

Figure 7. Histograms of Residual Values for Models 6a (Left), 6b (Middle) and 6c (Right)

The standardised pattern matrix coefficients of Model 6b are displayed in Table 6. Model 6b demonstrated a mean h^2 of .721 (range: .611 to .829). These values have been previously categorised as "high", although interpretations do vary (MacCallum, et al. 1999). MacCallum, et al. (1999), on the basis of their findings, recommended a minimum mean h^2 of .700 and a narrow h^2 range (in addition to their observations relating to the lower limit of h^2 = .600, adopted as a threshold/cut-off value in the present research). Model 6b adequately met this recommendation, increasing the chances of accurate population factor recovery (MacCallum, et al. 1999). Given the moderate number of common factors in the final simple solution and high communality values, the modest sample size (N_1 = 310) was probably adequate for the analysis of all 72 variables. As discussed in Section 4.2.1., the performance of the ULS estimation algorithm in EFA using polychoric **R** matrices has been subjected to simulation and empirical study. Lee, Zhang, and Edwards' (2012) results suggested that the approach is feasible both with large models (a 44-item, five-factor model was tested) and moderately large sample sizes (N > 228). The N of the *calibration* sample under analysis was safely above this recommended sample size. Although the size of the starting item pool is larger in this study, both the number of items (p) and the number of common factors in the model (r) are of a similar size to that tested by Lee, et al. (2012).

Significant standardised pattern matrix coefficients (λ > .400) ranged from .400 to 1.045, with a mean of .743. Two pattern matrix coefficients above absolute one were present

(AC_6: λ = 1.017; PE_2: λ = 1.045) although this does not necessarily indicate a problem in the data (Jöreskog, 1999). These values, as well as the communality values (h^2), unique terms (u^2) and Hofmann's (1978) index of variable complexity (c) are included in Table 6 for each item. The Hofmann (1978) index ranges from unity (c = 1), i.e. a single-factor solution, to r, the number of common factors – seven in the case of Model 6b. The index defines, for each observed variable, the number of common factors involved in the linear description of that variable (Hofmann, 1978). Post-rotation eigenvalues, proportional variance and cumulative variance of the 7-factor simple solution are available in Table 7, and the factor correlation matrix (**Φ** Matrix) is available in Table 8.

After Model 6b was generated by performing an iterative EFA analysis on the *calibration* subsample, and the hypothesis formulated that the EFA-derived model (Model 6b) would adequately fit the *validation* subsample in a CFA, the seven latent variables identified in Model 6b were named. The first factor was named "Group Attachment" and contained: a single item (GID_11) from the adapted Edwards and Peccei (2007) Organisational Identification Scale, which (as well as GID_10, removed in the sixth iteration of analysis) was conceptualised to measure a *sense of attachment, belonging, and membership of the (work)group*; four items from the adapted Meyer and Allen (1990) Affective Commitment Scale (AC_5, AC_6, AC_7 and AC_8); four items from the adapted Bollen and Hoyle (1990) Perceived Cohesion Scale (GC_1, GC_2, and GC_3, conceptualised to measure a *sense of belonging*, and GC_4, conceptualised to measure *feelings of morale*); and three items from the four-item *(work)group membership* subscale of the adapted Jansen et al. (2014) Perceived Group Inclusion Scale.

The second factor was named "Perceived Authenticity" and contained the complete *authenticity* subscale from the adapted Jansen et al. (2014) Perceived Group Inclusion Scale, which included *room for authenticity* and *value in authenticity*. The third factor was named "Behavioural Integration" and contained the full adapted Aaron, McDowell, and Herdman (2014) Team Satisfaction Scale (SWC_1, SWC_2, SWC_3, SWC_4, and SWC_5) and three items from the adapted Smith et al. (1994) Social Integration Scale (BI_6, BI_8, and BI_9). The factor relates to the individual's perception of integrated group behavior such as sticking together, "getting along", cooperating and helping one another. The factor also contains levels of satisfaction with characteristics associated with *behavioural integration*, i.e. the workgroup and its functioning, communication, leadership and internal relationship climate. The fourth, fifth and sixth factors were a complete representation of the *perceived control* (PE_1, PE_2, PE_3, PE_4, and PE_5), *perceived competence* (PE_6, PE_7, PE_8, PE_9, and

PE_10) and *goal internalisation* (PE_1, PE_2, PE_3, PE_4, and PE_5) subscales of the adapted Menon (2001) Psychological Empowerment Scale. Thus, the fourth factor was named "Perceived Control", the fifth factor was named "Perceived Competence" and the sixth factor was named "Goal Internalisation". Finally, the seventh factor represented the full *group affection* subscale (PGI_5, PGI_6, PGI_7, and PGI_8) of the adapted Jansen et al. (2014) Perceived Group Inclusion Scale and was named "Group Affection".

Table 7

Eigenvalues and Variance of Model 6b After Rotation (Promax)

	First-Order Factor						
	1	2	3	4	5	6	7
Eigenvalues	7.678	6.604	5.490	3.977	3.830	3.321	3.021
Proportion Variance	16.3%	14.1%	11.7%	8.5%	8.1%	7.1%	6.4%
Cumulative Variance	16.3%	30.4%	42.1%	50.5%	58.7%	65.7%	72.2%
Proportion Explained	22.6%	19.5%	16.2%	11.7%	11.3%	9.8%	8.9%
Cumulative Proportion	22.6%	42.1%	58.3%	70.0%	81.3%	91.1%	100%

Table 8

*Factor Correlation Matrix (**Φ** Matrix) of Model 6b*

	First-Order Factor						
	1	2	3	4	5	6	7
Factor 1: Group Attachment							
Factor 2: Perceived Authenticity	.735						
Factor 3: Behavioural Integration	.701	.745					
Factor 4: Perceived Control	.665	.633	.629				
Factor 5: Perceived Competence	.269	.194	.151	.463			
Factor 6: Goal Internalisation	.672	.569	.572	.704	.502		
Factor 7: Group Affection	.722	.732	.696	.698	.367	.563	

4.4. Exploratory Factor Analysis: Obtaining A Higher-Order Structure

Having obtained a seven-factor simple structure (Model 6b) a higher-order EFA (extension analysis) was conducted in order to determine if there were underlying higher-order factors that predicted the first-order factors. An examination of the factor correlation matrix of Model 6b (Table 8) revealed positive correlations ranging from .151 to .745 (*M* =

.571). “Perceived Competence” did not correlate strongly with “Group Attachment”, “Perceived Authenticity” or “Behavioural Integration” (.10 < *r* < .30), and correlated moderately (.30 < *r* < .50) with “Group Affection” (Cohen, 1992). Correlations between the other first-order factors were mostly strong (*r* > .50) suggesting that a higher-order EFA may reveal underlying common factors (Cohen, 1992). Also in support of the higher-order EFA were Bartlett’s test and the KMO statistic (KMO = .877, $\chi^2_{21} = 1483.444$, $p < .001$).

The **Φ** (Phi) matrix of Model 6b was assessed for an appropriate number of common factors (see Table 3). Horn’s (1965) parallel analysis, Jolliffe’s (1972) criterion and the VSS2 statistic (.988) (Revelle & Rocklin, 1979) suggested a two-factor solution. Velicer’s MAP (1976) (.070), the VSS1 statistic (.924) (Revelle & Rocklin, 1979) and Kaiser’s criterion (1970) suggested a one-factor solution. Both Schwarz’s (1978) BIC (-14.517) and the SABIC (Sclove, 1987) (-5.001) suggested a three-factor solution. Three models were thus specified, reflecting the common factor number choices posed by the methods in use, with three (Model A), two (Model B) and one common factor (Model C). The three-factor solution (Model A) accounted for a cumulative 76.8% of the common variance, the two-factor solution (Model B) accounted for a cumulative 70.6% of the variance, while the one-factor solution (Model C) accounted for 59.7% of the common variance in the data. The χ^2_{model} was significant for the two and one-factor solutions, but not the three-factor solution.

The RMSEA values of Models B and C did not indicate good fit, falling above the suggested upper threshold of .08 (Hu & Bentler, 1999). The RMSEA of Model A was low, indicating excellent fit, although the confidence interval was wide. Kenny, Kaniskan and McCoach (2015) advise caution when interpreting the RMSEA for small degrees of freedom models. An examination of the Tucker Lewis Fit Index (NNFI), which favoured the three-factor solution (Model A) indicated an alignment with the RMSEA values, with both the one and two-factor solutions falling below .96, the commonly applied lower threshold of good fit (Hu & Bentler, 1999) The residual-based absolute fit indices (SRMR and Fit) suggested a good fit for the three- and two-factor solutions, while the SRMR of the one-factor solution fell below the recommended threshold of .06 (Hu & Bentler, 1999).

With respect to the three- (Model A), two- (Model B) and one-factor solutions (Model C), the VSS1 and VSS2 statistics (Table 3 and 5) had repeatedly suggested one- and two-factor solutions throughout the six initial iterations of EFA. The data in Model 6b (Table 6) was not very factorial complex, and Hoffman’s (1978) index of complexity (*c*) ranged from 1.020 to 2.600 (M_c = 1.285), conditions under which the VSS indices are purported to

function well (Hofmann, 1978; Revelle, 2017c). And yet in the higher-order EFA, the three-factor solution (Model A) fitted best, while the one-factor solution (Model C) had the least good fit. The fit of nested models can also be compared with chi-squared difference tests. A series of comparisons were drawn in order to compare the fit of the three models: the three-factor model fitted the data significantly better than either the two- ($\chi^2_{difference}(5) = 39.07$, $p < .001$) or one-factor models ($\chi^2_{difference}(11) = 173.72$, $p < .001$). The two-factor model in turn also fit significantly better than the one- factor model ($\chi^2_{difference}(6) = 134.66$, $p < .001$).

Table 9

Fit Statistics of the Higher-Order Structure Models (Calibration Sample)

					90% CI					
Model	χ^2_{model}	*df*	*p*	RMSEA	Low	High	SRMR	Fit	NNFI	BIC
A	2.693	3	.441	.000	.000	.0921	.0054	1.00	1.002	-14.517
B	41.762	8	<.001	.1179	.083	.1530	.0236	.998	.939	-4.131
C	176.418	14	<.001	.1951	.1688	.2198	.0821	.981	.833	96.106

Note. $N_1 = 310$; χ^2_{model} = model chi-square statistic; *df* = degrees of freedom; *p* = probability value; RMSEA = root mean square error of approximation; CI = confidence interval of the RMSEA statistic; NNFI = Non-Normed Fit Index (Tucker Lewis Fit Index); BIC = Bayesian Information Criterion; RMSR = root mean square of the residuals; Fit = fit based upon off diagonal values.

The distributions of the residual values of each of these models are available in Figure 8. While each distribution approximated a standard normal deviation, there are visibly more outliers in the one-factor solution (Model C), as reflected in the larger SRMR of that model and thus poorer fit.

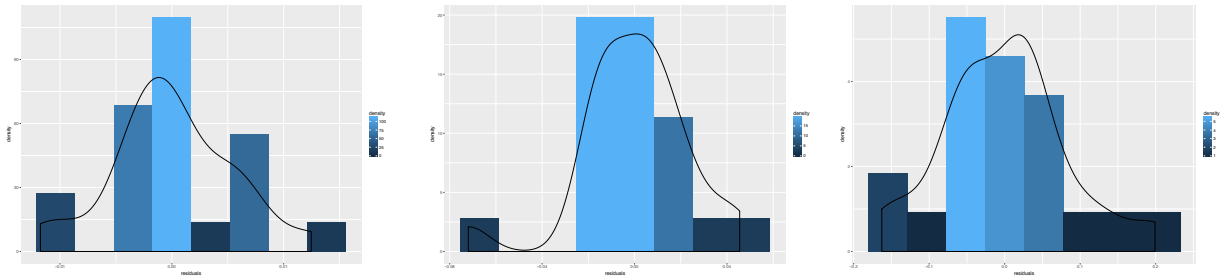

Figure 8. Histograms of Residual Values for EFA Higher-order Models A (Left), B (Middle) and C (Right)

The standardised pattern matrix coefficients of Model A are displayed in Table 10. Model A demonstrated a mean h^2 of .768 (range: .687 to .996). These values adequately met MacCallum, et al.'s (1999) recommendations of a minimum mean h^2 of .700, a narrow h^2

range, and a lower limit of h^2 = .600. Significant standardised pattern matrix coefficients (i.e. λ > .400) ranged from .558 to .922, with a mean of .823. Hoffman's (1978) index of complexity (*c*) ranged from 1.020 to 1.600 (M_c = 1.161). These values, as well as the communality values (h^2), unique terms (u^2) and Hofmann's (1978) index of variable complexity (*c*) are included in Table 10 for each first-order factor. Post-rotation eigenvalues, proportional variance and cumulative variance of the three-factor higher order model are available in Table 11, and the factor correlation matrix (**Φ** Matrix) is available in Table 12. The standardised pattern matrix coefficients of Models B and C are presented in Appendix P.

Model A was generated by performing an iterative EFA analysis on the factor correlation matrix of Model 6b (**Φ** Matrix), resulting in three possible models. Of these models, the three-factor solution (Model A) demonstrated the best fit. The first higher-order factor was named "Social Integration" and contained the "Group Attachment", "Perceived Authenticity", "Group Affection", "Behavioural Integration" and "Perceived Control" first-order factors. The second higher-order factor was named "Goal Internalisation" and contained the "Goal Internalisation" first-order factor. Finally, the third higher-order factor was named "Perceived Competence" and contained the "Perceived Competence" first-order factor. After determining both a seven-factor simple structure (Model 6b) and potential higher-order structures (Models A, B, and C), hypotheses were proposed relating to the generalisability of these four models to the *validation* sample, and the comparative goodness of fit of the higher-order models.

Rather than simply testing the higher-order model of best fit in the *calibration* sample (Model A) on the *validation* sample, all three higher-order models were assessed for adequacy of fit. Higher-order models demonstrating adequate fit in the *validation* sample were then compared to one another in order to build an argument for the structure of *social integration* in the two samples under analysis. In conclusion, the analysis of the *calibration* sample justified the following hypotheses (Haig, 2005a):

H_2: EFA Model A adequately reproduces **R** of the *validation* sample.
H_3: EFA Model B adequately reproduces **R** of the *validation* sample.
H_4: EFA Model C adequately reproduce **R** of the *validation* sample.
H_5: EFA Model A reproduces **R** of the *validation* sample with greater accuracy than EFA Models B or C.

Table 10

*EFA Model A: Standardised Loadings (Pattern or **Λ** Matrix) Based Upon Correlation Matrix*

	Higher-Order Factor					
	Social Integration	Goal Internalisation	Perceived Competence	h^2	u^2	c
Factor 1: Group Attachment	**0.744**	0.176	-0.048	0.726	0.274	1.120
Factor 2: Perceived Authenticity	**0.917**	-0.003	-0.115	0.759	0.241	1.030
Factor 3: Behavioural Integration	**0.866**	0.077	-0.182	0.726	0.274	1.100
Factor 4: Perceived Control	**0.558**	0.147	0.269	0.694	0.306	1.600
Factor 5: Perceived Competence	-0.092	0.049	**0.840**	0.687	0.313	1.030
Factor 6: Goal Internalisation	0.034	**0.922**	0.089	0.996	0.004	1.020
Factor 7: Group Affection	**0.916**	-0.214	0.219	0.790	0.210	1.230

Note. h^2 = communality values; u^2 = unique values; c = Hofmann's (1978) index of complexity. Pattern matrix coefficients > .4 are presented in bold

Table 11

Eigenvalues and Variance of EFA Model A After Rotation (Promax)

	Higher-Order Factor		
	Social Integration	Goal Internalisation	Perceived Competence
Eigenvalues	3.370	1.083	0.924
Proportion Variance	48.1%	15.5%	13.2%
Cumulative Variance	48.1%	63.6%	76.8%
Proportion Explained	62.7%	20.1%	17.2%
Cumulative Proportion	62.7%	82.8%	100%

Table 12

*Factor Correlation Matrix (**Φ** Matrix) of EFA Model A*

	Higher-Order Factor		
	Social Integration	Goal Internalisation	Perceived Competence
Factor 1: Social Integration			
Factor 2: Goal Internalisation	.681		
Factor 3: Perceived Competence	.440	.555	

4.5. Confirmatory Factor Analysis: Methodological Choices

After determining that a seven-factor structure (Model 6b) with three higher-order factors (Model A) fitted the data in the *calibration* subsample best, hypotheses one to five were tested with CFA by fitting the EFA-derived models to the *validation* subsample. These analyses served to determine if the models generalised to a second sample drawn from the same population group, and in the case of the higher-order models (Model A, B, and C), to determine the best fitting higher-order model in the *validation* sample. In reporting the CFA results Schreiber, Nora, Stage, Barlow and King's (2006) recommendations were followed.

4.5.1. Choice of estimator. Model parameters were estimated using what is referred to as "three stage robust diagonally squares", a robust combination of the DWLS estimator, scaled-shifted test statistic ($SS\chi^2_{model}$) and robust standard errors (Katsikatsou, Moustaki, Yang-Wallentin, Jöreskog, 2012; Rosseel, 2017). When ordinal data is in use, *lavaan* calculates a polychoric **R** instead of covariance matrix (**S**) from which to estimate parameters. Polychoric **R** was calculated with quick two-step ML estimation (Dragstow, 1988; Olsson, 1979), with the ".50 correction" for zero value cells. The fit of the final model of *social integration* was checked by estimating the model with both robust DWLS and ULS.

4.5.2. Specification of latent variable scale. As latent variables do not have a scale of their own, a scale may either be taken from the first indicator of each latent variable, or via the fixed factor method, whereby the variance of latent variables is set to one (i.e. a mean of 0). The fixed factor method allows for easier interpretation of the inter-factor covariance matrix (**Φ**) because it results in standardised values and is recommended as the preferable method (Brown, 2015). The fixed factor approach was thus adopted.

4.5.3. Selection of indicators (observed variables). Indicators were chosen by selecting three items per factor from EFA Model 6b (Table 6) with the highest pattern matrix coefficients. Model specifications with four indicator variables per latent variable were attempted, but were not possible because the dataset was not sufficiently large. This meant that identical models were not fitted to the *validation* sample, in terms of using the same indicators to measure each latent variable. For example, eight observed variables were predicted by the second factor ("Perceived Authenticity") in EFA Model 6b. In the model tested by CFA on the *validation* sample, "Perceived Authenticity" predicts variance in only three observed variables. However, these three variables (PGI_13, PGI_15 and PGI_16) are identical measures in both models and emerged as the best indicators (items) of "Perceived Authenticity" in the *calibration* sample. Item-level data is noted for its instability between

samples (Gorsuch, 1997a), however summarisation strategies such as parceling are also noted for their limitations (Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013; Yang, Nay, & Hoyle, 2010). A key to the indicators used in the CFA models is included in Table 13.

Table 13

Key to the Indicators Used in CFA Models

Factor	Indicator	Variable	Description
1	X_1	AC_6	I feel 'emotionally attached' to this workgroup
	X_2	AC_7	This workgroup has a great deal of personal meaning for me
	X_3	GC_1	I feel a sense of belonging to my workgroup
2	X_4	PGI_13	My workgroup encourages me to be authentic
	X_5	PGI_15	My workgroup encourages me to express my authentic self
	X_6	PGI_16	My workgroup encourages me to present myself the way I am
3	X_7	SWC_3	I am satisfied with the communication between workgroup members
	X_8	SWC_5	I am satisfied with the relationship climate within my workgroup
	X_9	BI_6	The members of my workgroup get along together very well
4	X_{10}	PE_2	I have the authority to make decisions at work
	X_{11}	PE_4	I can influence decisions taken in my workgroup
	X_{12}	PE_5	Important responsibilities are part of my job
5	X_{13}	PE_7	I have the competence to work effectively
	X_{14}	PE_8	I have the capabilities required to do my job well
	X_{15}	PE_9	I can handle the challenges I face at work
6	X_{16}	PE_11	I am inspired by the goals of my workgroup
	X_{17}	PE_12	I am enthusiastic about working toward my workgroup's objectives
	X_{18}	PE_14	I am inspired by what we are trying to achieve as a workgroup
7	X_{19}	PGI_5	My workgroup likes me
	X_{20}	PGI_6	My workgroup appreciates me
	X_{21}	PGI_7	My workgroup is pleased with me

Note. AC = Affective Commitment; GC = Group Cohesion; SWC = Satisfaction with Co-Workers; BI = Behavioural Integration; PGI = Perceived Group Inclusion; PE = Psychological Empowerment.

4.5.4. Fit statistics. The $SS\chi^2_{model}$ is reported in tables, although the Satorra-Bentler test statistic ($SB\chi^2_{model}$) is at times included in text for comparison (Satorra & Bentler, 1988). In addition to the selection of fit statistics used in the *calibration* sample (Section 4.2.6)., the following measures of fit are included in the CFA models. The Comparative Fit Index (CFI) is a widely used comparative fit statistic, with values falling between 0 and 1 and higher values indicating greater model fit (Hu & Bentler, 1999; Jackson, et al., 2009). Current practice follows Hu and Bentler's (1999) recommendation (based on ML estimation) that a value greater than .95 indicates acceptable fit. The *p* of close fit ($p_{close\ fit}$) statistic is a one-sided test of the null-hypothesis that RMSEA = 0.05. Thus, a non-significant $p_{close\ fit}$ value is interpreted as a close-fitting model, and vice-versa.

As the CFA models were testing hypotheses, i.e. whether the EFA-derived models adequately reproduce **R** of the *validation* sample, thresholds were set by which models were accepted or rejected. The following minimum fit statistic thresholds were applied to all CFA models in order to test hypotheses one to five: RMSEA < .08; CFI > .95; NNFI/TLI > .96; and SRMR < .06. The $SS\chi^2_{model}$ was noted when interpreting goodness of fit, but was not used to accept or reject CFA models because the size of the *validation* sample (N_2 = 310) was large enough to influence a χ^2 test and potentially result in rejecting models unnecessarily.

4.6. Confirmatory Factor Analysis: Testing the Simple Structure

The full simple structure model is depicted graphically in Figure 9, with ovals representing latent variables and rectangles representing measured variables. EFA-derived Model 6b was fitted to the *validation* sample (N_2 = 310) incrementally, beginning with the measurement model of the first latent variable (the fit statistics of these models are presented in Table 14). This was named "Model 1" and the incremental approach to replicating EFA Model 6b resulted in a total of seven models, the seventh being the full simple structure model depicted in Figure 9. Where the model fitted to the *validation* sample (CFA Model 7) differs to that developed in the *calibration* sample (EFA Model 6b) is the number of observed variables (indicators) predicted by each latent variable. In the case of EFA Model 6b, the first latent variable ("Group Attachment") was measured by twelve observed variables, whereas in CFA Model 1, "Group Attachment" is measured by only three observed variables. This is because, as explained previously in Section 4.5.3, the *validation* sample was not large enough to allow for more observed variables.

While CFA models can be depicted visually, they may also be specified in equation form. For example, Model 1 could be expressed as follows, where ξ_1 is Factor 1 ("Group Attachment"), δ_1 is the unique variance of observed variable X_1, and λ_{11} is the regression coefficient relating to ξ_1:

$$X_1 = \lambda_{11}\,\xi_1 + \delta_1$$
$$X_2 = \lambda_{21}\,\xi_1 + \delta_2$$
$$X_3 = \lambda_{31}\,\xi_1 + \delta_3$$

Model 2 could be specified as follows, where in addition to the equations of Model 1, ξ_2 is Factor 2 ("Perceived Authenticity"), δ_4 is the unique variance of observed variable X_4, and λ_{42} is the regression coefficient relating to ξ_2:

$$X_1 = \lambda_{11}\,\xi_1 + \delta_1$$
$$X_2 = \lambda_{21}\,\xi_1 + \delta_2$$
$$X_3 = \lambda_{31}\,\xi_1 + \delta_3$$
$$X_4 = \lambda_{42}\,\xi_2 + \delta_4$$
$$X_5 = \lambda_{52}\,\xi_2 + \delta_5$$
$$X_6 = \lambda_{62}\,\xi_2 + \delta_6$$

CFA Model 7 was assessed for fit in order to determine if the model generated in the *calibration* sample (EFA Model 6b) adequately replicated **R** in the *validation* sample (H_1). The fit indices of CFA Model 7 demonstrate an adequate fit, although both the $SS\chi^2_{model}$ statistic and Satorra-Bentler statistic were significant ($SB\chi^2_{model}$ (168) = 481.564, $p < .001$). The standard test statistic offered by *lavaan* did not reject Model 7 (χ^2_{model} (168) = 158.355, $p = .691$). The standard test is less robust than the $SS\chi^2_{model}$ (scaled-shifted) statistic (Rosseel, 2017). The choice of χ^2 influences the RMSEA, CFI and NNFI and by using the most robust option these indices become "stricter" on the model, which in turn reduces the chances of accepting a model easily.

As all other fit statistics indicated an adequate fit, it is possible that these significant $SS\chi^2_{model}$ statistics could be attributed to the sample size (refer to Section 4.2.6.). The $p_{close\ fit}$ was non-significant for each of the seven models, indicating models of close fit. Section 4.5.4. outlined the threshold values by which models were accepted or rejected (RMSEA < .08; CFI > .95; NNFI/TLI > .96; and SRMR < .06). The fit of CFA Model 7 thus fell within these thresholds and it was concluded that CFA Model 7 reproduced the polychoric **R** of the *validation* sample with acceptable accuracy. A heatplot of polychoric **R** of the *validation* sample is presented in Figure 10. An examination of the distribution of the residual values (Figure 10) indicated no deviations from the expected standard normal distribution. Hypothesis One was thus supported by the results.

CFA Model 7 demonstrated a mean δ (error/residual term) of .249 (range: .124 to .403). Standardised regression weights ranged from .722 to .936 ($M = .865$). The standardised parameters of CFA Model 7 are presented graphically in Figure 9. The (standardised) covariance matrix of the latent variables is presented in Table 15. Standardised covariance values between latent variables ranged from .179 to .799 ($M = .556$), similar to those of the EFA Model 6b correlation matrix, which ranged from .151 to .745 ($M = .571$).

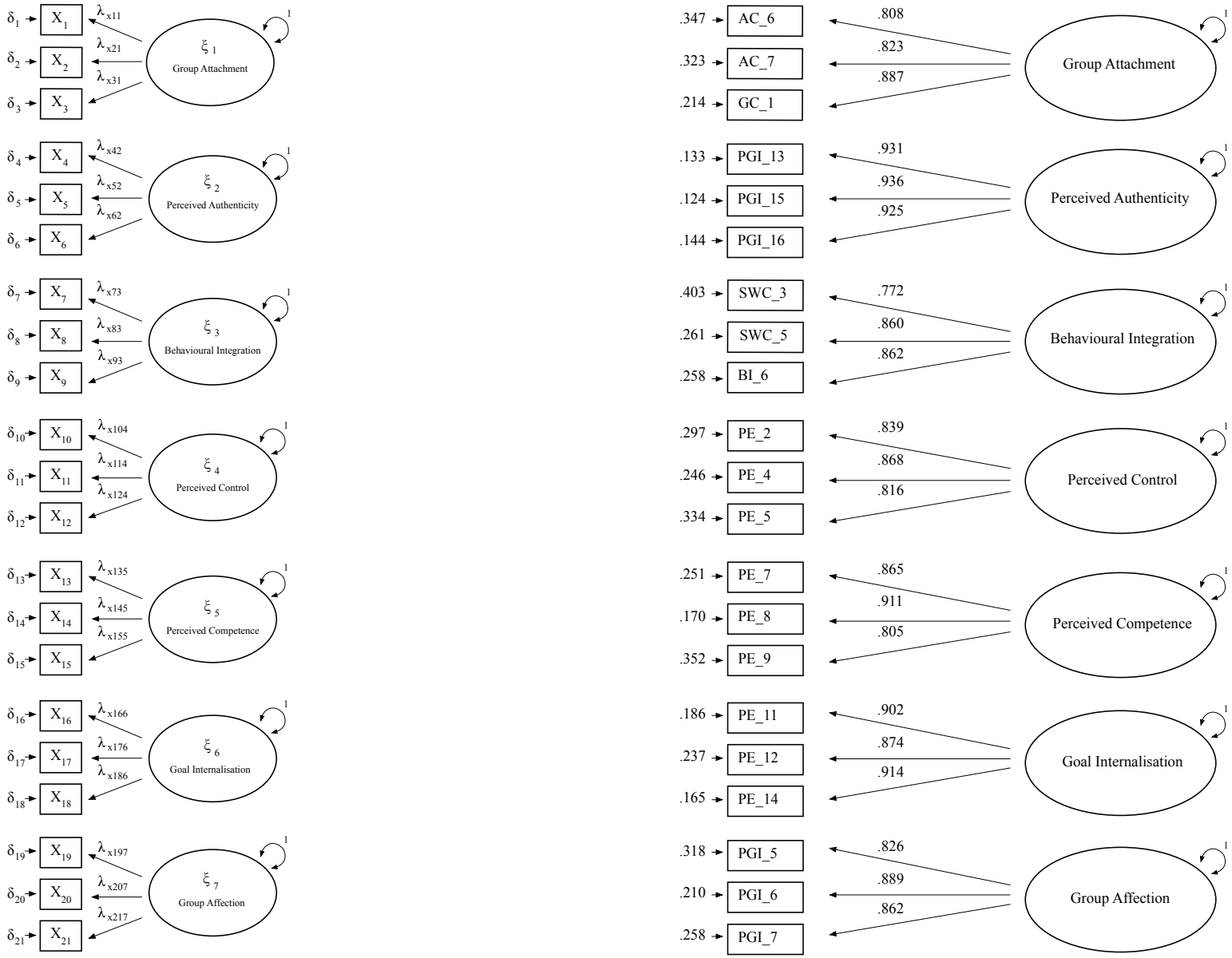

Figure 9. Specification (Left) and Standardised Parameters (Right) of CFA Model 7

Table 14

Fit Statistics of the Simple Structure Models (Validation Sample)

					90% CI					
Model	$SS\chi^2_{model}$	*df*	*p*	RMSEA	Low	High	$p_{close\ fit}$	CFI	NNFI	SRMR
Model 1	.000	0	<.001	.000	.000	.000	NA	1.000	1.000	.000
Model 2	11.767	8	.162	.039	.000	.083	.602	.999	.999	.015
Model 3	44.204	24	.007	.052	.027	.076	.410	.997	.995	.023
Model 4	77.928	48	.004	.045	.025	.063	.660	.996	.994	.027
Model 5	221.517	80	<.001	.076	.064	.088	.900	.981	.975	.042
Model 6	279.804	120	<.001	.066	.056	.076	.055	.981	.976	.038
Model 7	311.909	168	<.001	.053	.043	.062	.306	.985	.982	.035

Note. N_2 = 310; $SS\chi^2_{model}$ = model chi-square; *df* = degrees of freedom; *p* = probability value of chi-square test; RMSEA = root mean square error of approximation; CI = confidence interval of the RMSEA statistic; $p_{close\ fit}$ = *p* of close fit for RMSEA < .05; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = standardised root mean square of the residuals.

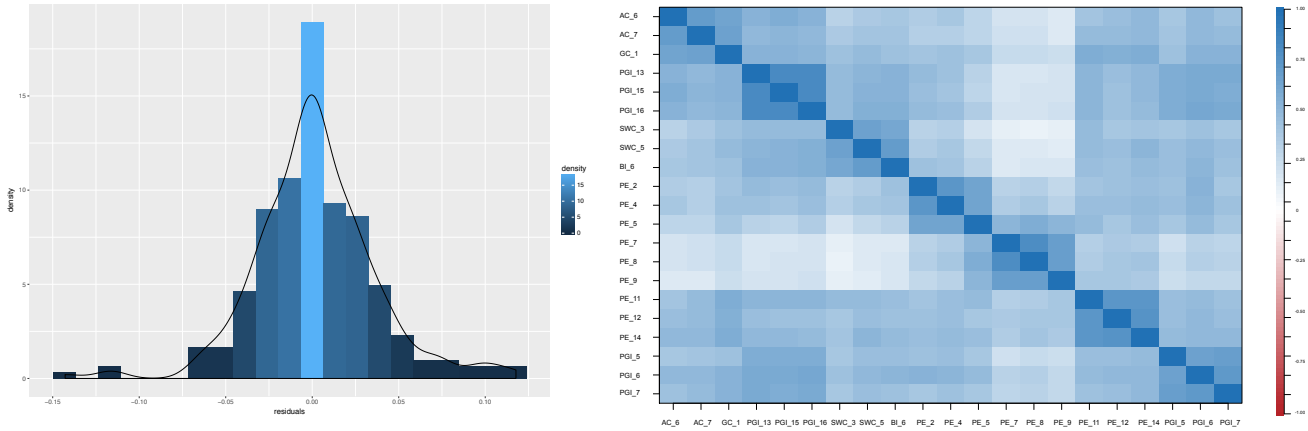

Figure 10. Histogram of Residual Values for CFA Model 7 (Left) and Heatplot of the Polychoric **R** Generated by Lavaan for the Same Indicators (Right).

4.7. Confirmatory Factor Analyses: Testing the Higher-Order Structure

Having first tested the fit of the simple structure (CFA Model 7) and found it acceptable, the higher-order structures suggested by the exploratory extension analysis in Section 4.4. were specified and fitted to the *validation* sample. These models, using the typology of Brunner, et al. (2012), were classified as three contrasting higher-order factor models and formed the basis of Hypotheses Two, Three, Four and Five. These three models are presented graphically in Figure 11. A note on the manner in which these models have been diagrammed is necessary as only the three-factor solution (EFA Model A) developed in the *calibration* sample was presented in Section 4.4. The decision to present only the higher-order structure of best fit and not the two- (EFA Model B) and one-factor (EFA Model C) solutions was taken in order to minimise the length of the dissertation. Thus, CFA Model A

represents EFA Model A. The difference, as with the preceding CFA models, is that only three observed variables (indicators) per first-order latent variable were possible.

Table 15

*(Standardised) Covariances Between Latent Variables of CFA Model 7 (**Φ** Matrix)*

	First-Order Factor						
	1	2	3	4	5	6	7
Factor 1: Group Attachment							
Factor 2: Perceived Authenticity	.698						
Factor 3: Behavioural Integration	.597	.695					
Factor 4: Perceived Control	.518	.546	.522				
Factor 5: Perceived Competence	.301	.233	.179	.531			
Factor 6: Goal Internalisation	.704	.616	.637	.592	.487		
Factor 7: Group Affection	.698	.799	.667	.651	.349	.652	

CFA Model B represents the two-factor solution suggested in EFA Model B (presented in Appendix P). In this two-factor model, the sixth factor ("Goal Internalisation"), loaded onto both the first ("Social Integration") and second ("Perceived Competence") higher-order factors. For the purposes of comparing the three models, both in the *calibration* and *validation* subsamples, the sixth factor was not removed for a lack of discrimination (refer to Appendix P). CFA Model C, reflecting EFA Model C, simply contains a single general factor ("Social Integration"). Thus, CFA Models A and B specify solutions whereby first-order factors of the simple solution are excluded from a larger higher-order factor ("Social Integration") that predicts variance in the remaining first-order factors.

CFA Model C did not meet the requirements of adequate model fit outlined in Section 4.5.5. because the SRMR value exceeded .60 and the NNFI fell marginally below the adopted threshold value of .96. Both the CFI and RMSEA of CFA Model C were within acceptable range. Hypothesis Four was thus not supported. CFA Models A and B both demonstrated acceptable fit, although the fit statistics for both models fell close to the adopted thresholds used to reject potential models. The $p_{close\ fit}$ statistic was significant for each of the three models, indicating a lack of close fit. The $SS\chi^2_{model}$ statistics were significant for each model, although this might be attributable to the sample size. Neither the $p_{close\ fit}$ nor the $SS\chi^2_{model}$ statistics were used as rejection thresholds and CFA Models A and B were considered to be supported by the available evidence. Hypotheses Two and Three were thus supported. No deviations from the standard normal distribution were evident in the distribution of the

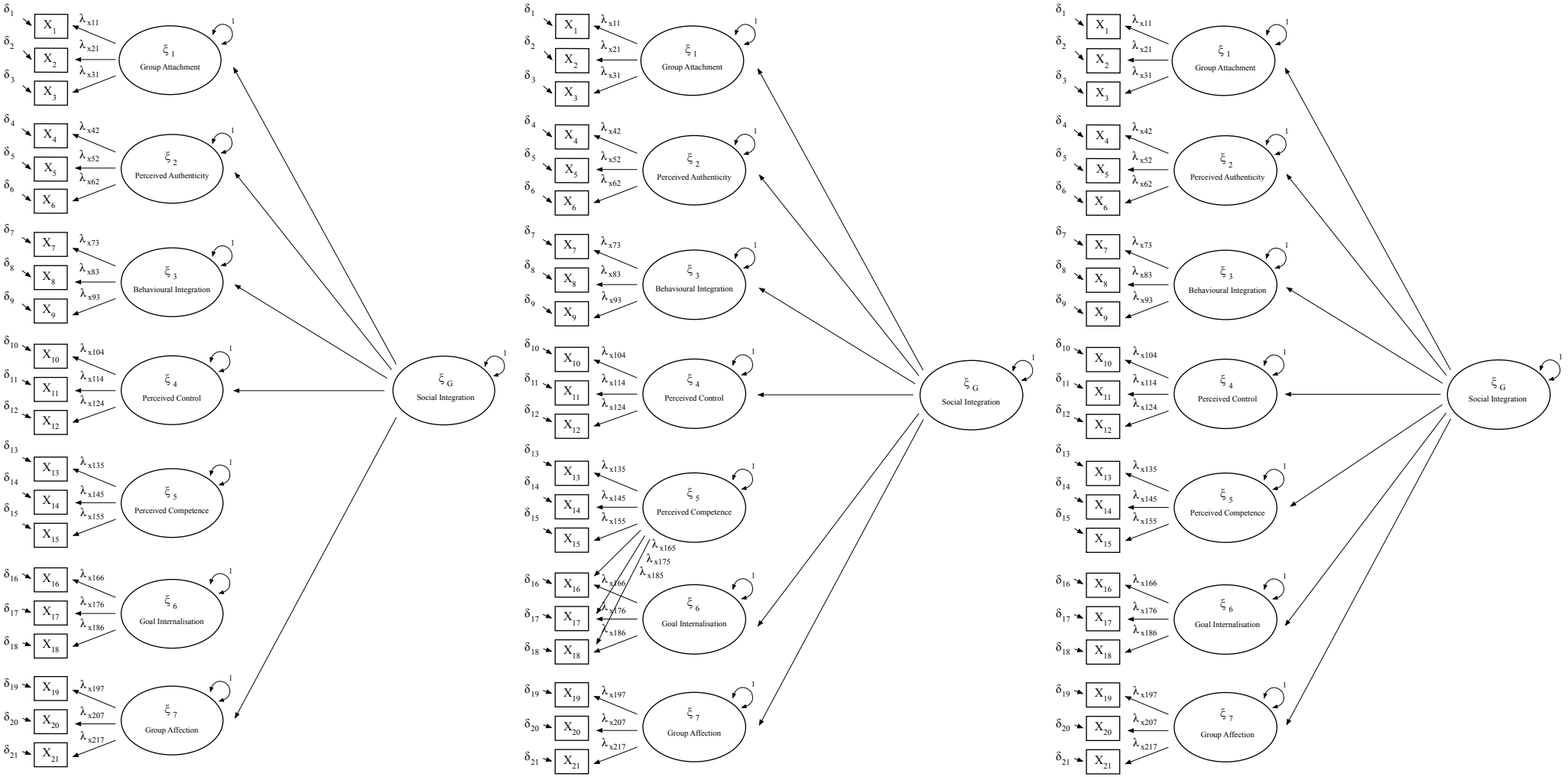

Figure 11. Specification of CFA Higher-Order Models A (Left), B (Middle) and C (Right).

residual correlation values. Histograms of the residual values are presented in Figure 12. The standardised parameters of CFA Models A and B are presented in Figure 13.

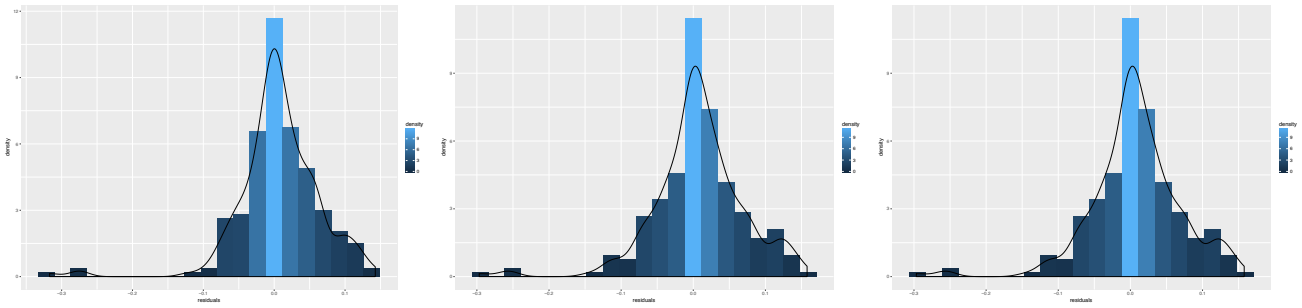

Figure 12. Residual Values for Higher-Order Models A (Left), B (Middle) and C (Right)

As CFA Model C was rejected and Hypothesis Four thus not supported, only CFA Models A and B were compared in order to test Hypothesis Five (H_5). H_5 was tested by comparing the fit statistics of the three models and by performing a series of chi-squared difference tests. A significant difference in model fit between the two models was not present when using either the standard χ^2_{model} statistic available in *lavaan* ($\chi^2_{difference}$ (2) = 2.04, p = .362), or the robust $SS\chi^2_{model}$ statistic ($\chi^2_{difference}$ (2) = 1.79, p = .408). An examination of the fit statistics (Table 16) also revealed little difference between the three- (CFA Model A) and two-factor (CFA Model B) models. SRMR and CFI values were identical and there was a .001 difference between both NNFI and RMSEA values. H_5 was thus not supported.

Table 16

Fit Statistics of the CFA Higher-Order Structure Models (Validation Sample)

					90% CI					
Model	$SS\chi^2_{model}$	*df*	*p*	RMSEA	Low	High	$p_{close\ fit}$	CFI	NNFI	SRMR
A	498.501	181	<.001	.075	.068	.083	<.001	.967	.962	.059
B	500.295	179	<.001	.076	.068	.084	<.001	.967	.961	.059
C	530.654	182	<.001	.079	.071	.087	<.001	.964	.959	.064

Note. N = 310; $SS\chi^2_{model}$ = model chi-square; *df* = degrees of freedom; p = probability value of chi-square test; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval of the RMSEA statistic; $p_{close\ fit}$ = p of close fit for RMSEA < .05; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardised Root Mean Square of the Residuals.

4.8. Social Integration: Defining the Construct and Measure

The 21 items that made up the indicators used to construct all CFA models (Table 13) were treated as a short-list for the measure of *social integration* proposed by the present research. In both Model A and B, the latent variable *perceived competence* was distinct from

the larger higher-order latent variable which was named *social integration*. *Perceived competence* was thus posited to not be a part of the *social integration* construct and the three indicators (PE_7, PE_8 and PE_9) that measured *perceived competence* were excluded.

The contribution of *goal internalisation* to the broader *social integration* construct was less clear. In the initial three-factor solution (EFA Model A) the first-order factor, *goal internalisation*, loaded distinctly onto a separate higher-order factor. In the initial two-factor solution (EFA Model B), *goal internalisation* was predicted equally by *social integration* and the second higher-order factor, *perceived competence* (refer to Appendix P). In the confirmatory models fitted to the *validation* sample, the three-factor solution (CFA Model A) was not a better fit to the data than the two-factor solution (CFA Model B). Further, in the two-factor solution (CFA Model B) indicators PE_11, PE_12 and PE_14 did not load significantly onto the second factor, *perceived competence* (i.e. $\lambda < .40$; see Figure 13) as they had done in EFA Model B. This was a different interpretation of the data to that of EFA Model B in which *goal internalisation* loaded equally onto the first (*social integration*) and second (*perceived competence*) higher order factors (see Figure 13).

Social integration was thus posited to be a higher order latent variable, consisting of five or possibly six sub-constructs, namely *group attachment*, *perceived authenticity*, *behavioural integration*, *perceived control*, *group affection* and possibly *goal internalisation*. In order to assess the fit of the models suggested by the higher-order analyses (i.e. without the *perceived competence* and possibly *goal internalisation* sub-constructs) both six- and five- sub-construct higher-order models were fitted post hoc to both the *calibration* and *validation* subsamples. The specification of both the six and five sub-construct higher-order models of *social integration* and presented in Figure 14. The six- sub-construct higher-order model of *social integration* was fitted to both the *calibration* ($SS\chi^2_{model}(129) = 269.001$, $p < .001$; RMSEA = .059 [CI: .046; .069]; CFI = .988; TLI = 985; SRMR = .040) and *validation* ($SS\chi^2_{model}(129) = 205.090$, $p < .001$; RMSEA = .044 [CI: .032; .055]; CFI = .991; TLI = 990; SRMR = .038) subsamples. The model demonstrated adequate fit in both samples. The five-sub-construct higher-order model was also fitted (i.e. omitting *goal internalisation*) to both the *calibration* ($SS\chi^2_{model}(85) = 114.006$, $p < .001$; RMSEA = .046 [CI: .032; .059]; CFI = .994; TLI = 993; SRMR = .030) and *validation* ($SS\chi^2_{model}(85) = 114.313$, $p = .019$; RMSEA = .033 [CI: .014; .048]; CFI = .996; TLI = 995; SRMR = .031) subsamples. The five- sub-construct model, too, demonstrated adequate fit in both samples. These results were aligned with the previous comparisons between CFA Model A and CFA Model B, where both

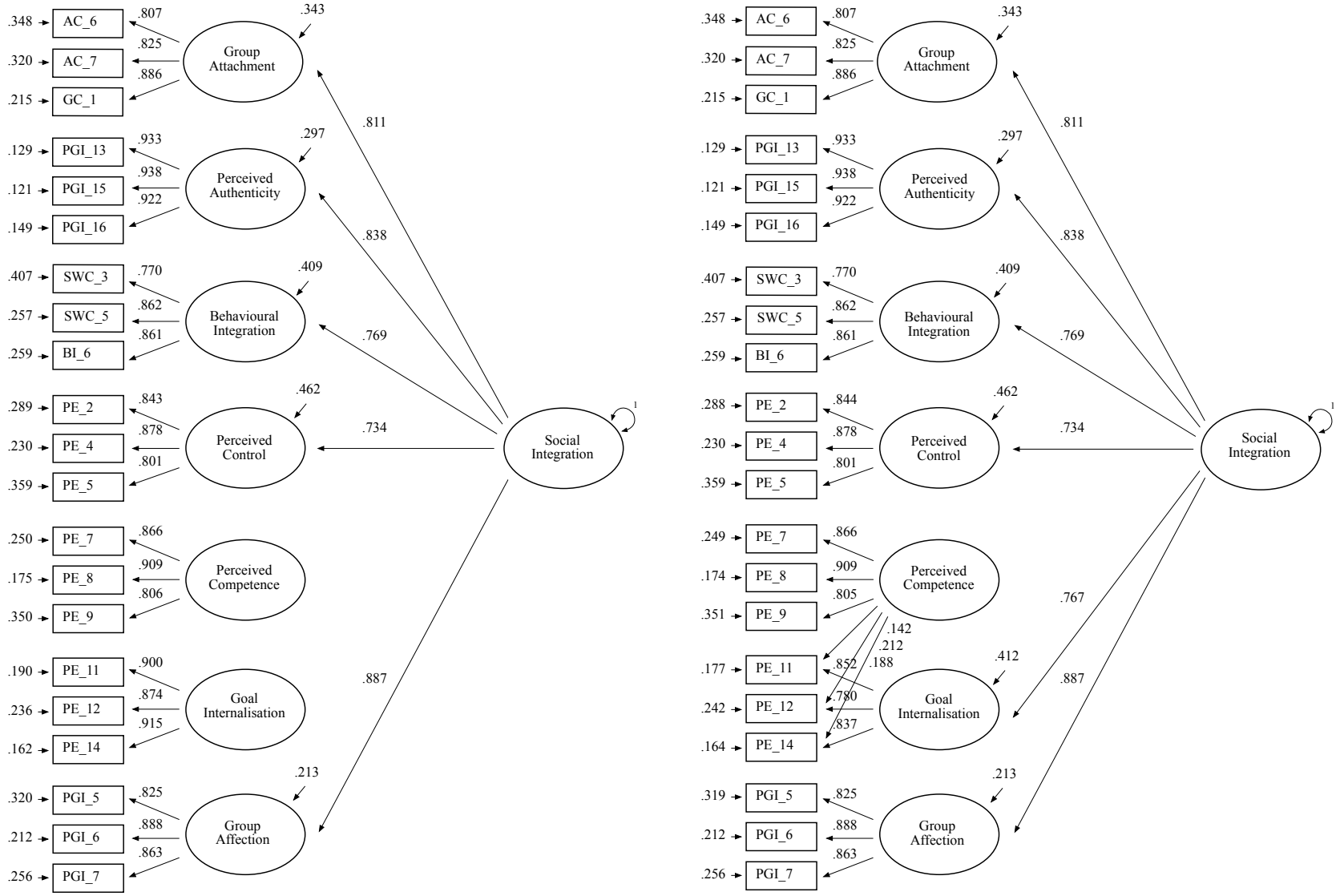

Figure 13. Standardised Parameters of CFA Higher-Order Models A (Left) and B (Right)

models demonstrated adequate fit and a significant difference in relative fit between the models was not evident.

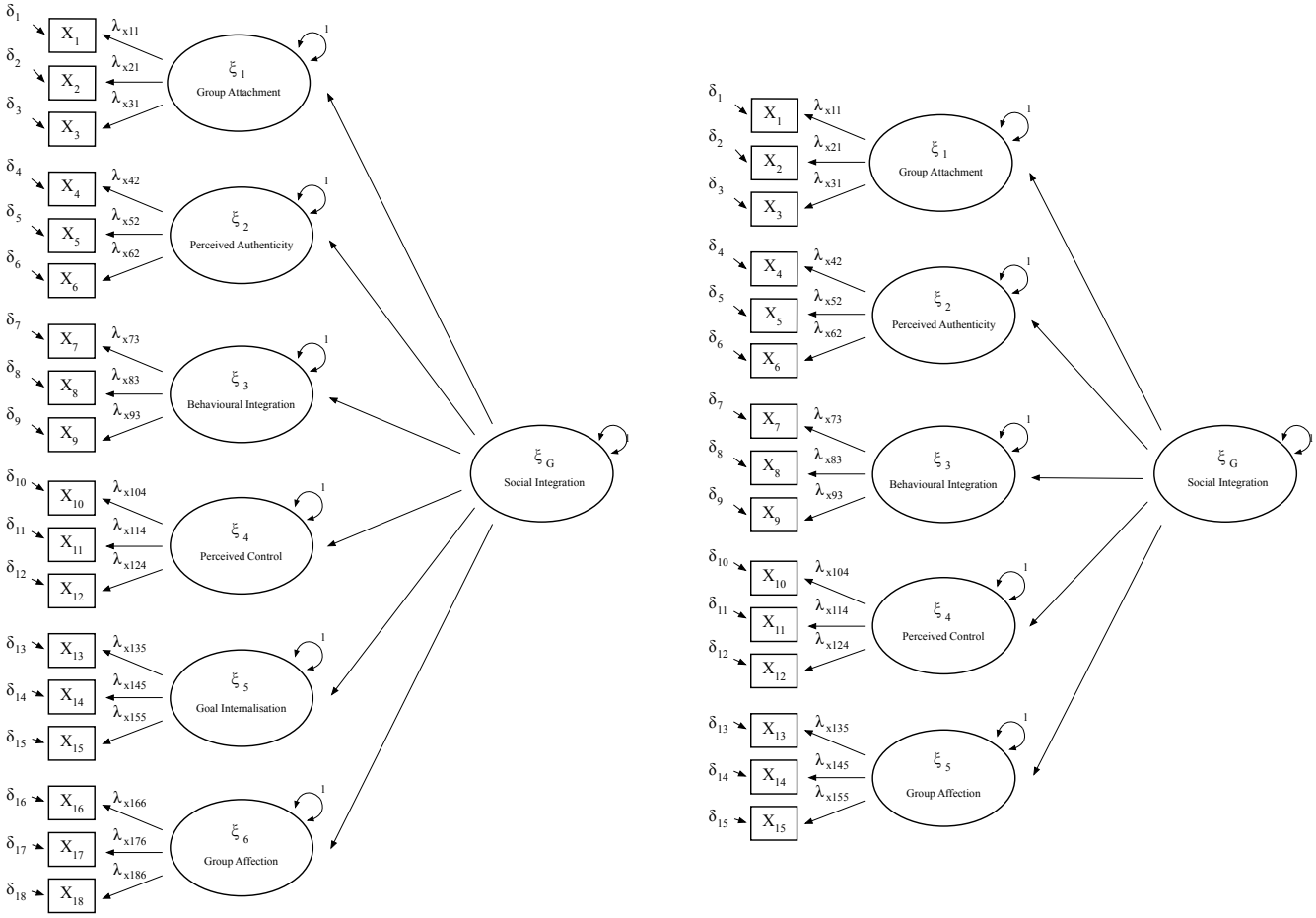

Figure 14. Six (Left) and Five (Right) Sub-Construct Higher-Order Models

Goal internalisation was thus posited to be a part of the broader *social integration* construct and the three indicators (PE_11, PE_12 and PE_14) that measured *goal internalisation* were retained. Finally, using robust ULS estimation, the six- sub-construct higher-order was fitted to the *calibration* ($SS\chi^2_{model}$ (129) = 243.015, $p < .001$; RMSEA = .053 [CI: .043; .064]; CFI = .984 TLI = 981; SRMR = .039) and *validation* ($SS\chi^2_{model}$ (129) = 197.225, $p < .001$; RMSEA = .041 [CI: .029; .053]; CFI = .987; TLI = 985; SRMR = .038) subsamples. The model again demonstrated adequate fit in both subsamples. Thus, *social integration* was concluded to be a higher-order construct that contains six sub-constructs: *group attachment*, *perceived authenticity*, *behavioural integration*, *perceived control*, *goal internalisation* and *group affection*, and the 18 items that made up the final model were considered to be a scale in the early stages of development (see Figure 15).

SOCIAL INTEGRATION SCALE

All responses recorded on a 5-category/point Likert-type scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

Group Attachment

1. I feel 'emotionally attached' to this workgroup
2. This workgroup has a great deal of personal meaning for me
3. I feel a sense of belonging to my workgroup

Perceived Authenticity

4. My workgroup encourages me to be authentic
5. My workgroup encourages me to express my authentic self
6. My workgroup encourages me to present myself the way I am

Behavioural Integration

7. I am satisfied with the communication between workgroup members
8. I am satisfied with the relationship climate within my workgroup
9. The members of my workgroup get along together very well

Perceived Control

10. I have the authority to make decisions at work
11. I can influence decisions taken in my workgroup
12. Important responsibilities are part of my job

Goal Internalisation

13. I am inspired by the goals of my workgroup
14. I am enthusiastic about working toward my workgroup's objectives
15. I am inspired by what we are trying to achieve as a workgroup

Group Affection

16. My workgroup likes me
17. My workgroup appreciates me
18. My workgroup is pleased with me

Figure 15. Proposed Scale of Social Integration

Gorsuch (2015) posits that it is useful to investigate the extent to which **R** can be accurately reproduced from only a higher-order model, i.e. examining how much variance a higher-order factor directly predicts in indicators, without the presence of first-order factors in the model. If **R** reproduces well, this builds an argument for an accurate and meaningful approach to the measurement of a construct, in that the items in use have been demonstrated to be adequate indicators of the proposed higher-order construct. If **R** does not reproduce well, the higher-order factor can be understood as an abstract theoretical idea, while indicators should be interpreted at the level of the first-order factors in practice (Gorsuch, 2015). To test this idea, a series of post-hoc models were specified incrementally, as

organised in Section 4.6. but without the first-order factors. For example, Model Two would be specified as follows, where ξ_1 is the latent variable *social integration*, δ_4 is the unique variance of observed variable X_4, and λ_{41} is the regression coefficient relating to ξ_1:

$$X_1 = \lambda_{11}\,\xi_1 + \delta_1$$
$$X_2 = \lambda_{21}\,\xi_1 + \delta_2$$
$$X_3 = \lambda_{31}\,\xi_1 + \delta_3$$
$$X_4 = \lambda_{41}\,\xi_1 + \delta_4$$
$$X_5 = \lambda_{51}\,\xi_1 + \delta_5$$
$$X_6 = \lambda_{61}\,\xi_1 + \delta_6$$

Three indicators were added to each incremental model. Thus, Model One in this section is identical to Model One in Section 4.6. Model Two is not equivalent in structure, but contains identical observed variables, as indicated in the above example. The observed variables in Model Three and Model Four are also identical to those in Section 4.6., but Models Five and Six are not (see Figure 16). Models Two, Three, Four, Five and Six did not adequately reproduce **R**, as evidenced by the fit statistics presented in Table 17. While the structural model of the remaining 18-item *social integration* scale adequately reproduced **R** of the *validation* sample ($SS\chi^2_{model}$ (129) = 205.090, $p < .001$; RMSEA = .044 [CI: .032; .055]; CFI = .991; TLI = 990; SRMR = .038), the same model specified without the first-order latent variables did not. It is thus posited that that the 18 observed variables in the measure are inadequate indicators of the higher order latent variable *social integration*.

Table 17

Fit Statistics of the CFA Higher-Order Factor Measurement Models (Validation Sample)

					90% CI					
Model	$SS\chi^2_{model}$	*df*	*p*	RMSEA	Low	High	$p_{close\ fit}$	CFI	NNFI	SRMR
Model 1	.000	0	<.001	.000	.000	.000	NA	1.000	1.000	.000
Model 2	234.931	9	<.001	.285	.254	.317	<.001	.962	.937	.108
Model 3	437.263	27	<.001	.222	.204	.240	<.001	.934	.913	.109
Model 4	808.534	54	<.001	.213	.200	.226	<.001	.890	.865	.123
Model 5	1096.102	90	<.001	.190	.180	.200	<.001	.869	.848	.104
Model 6	1236.137	135	<.001	.162	.154	.171	<.001	.874	.857	.101

Note. $N_2 = 310$; $SS\chi^2_{model}$ = model chi-square; *df* = degrees of freedom; *p* = probability value of chi-square test; RMSEA = root mean square error of approximation; CI = confidence interval of the RMSEA statistic; $p_{close\ fit}$ = *p* of close fit for RMSEA < .05; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = standardised root mean square of the residuals

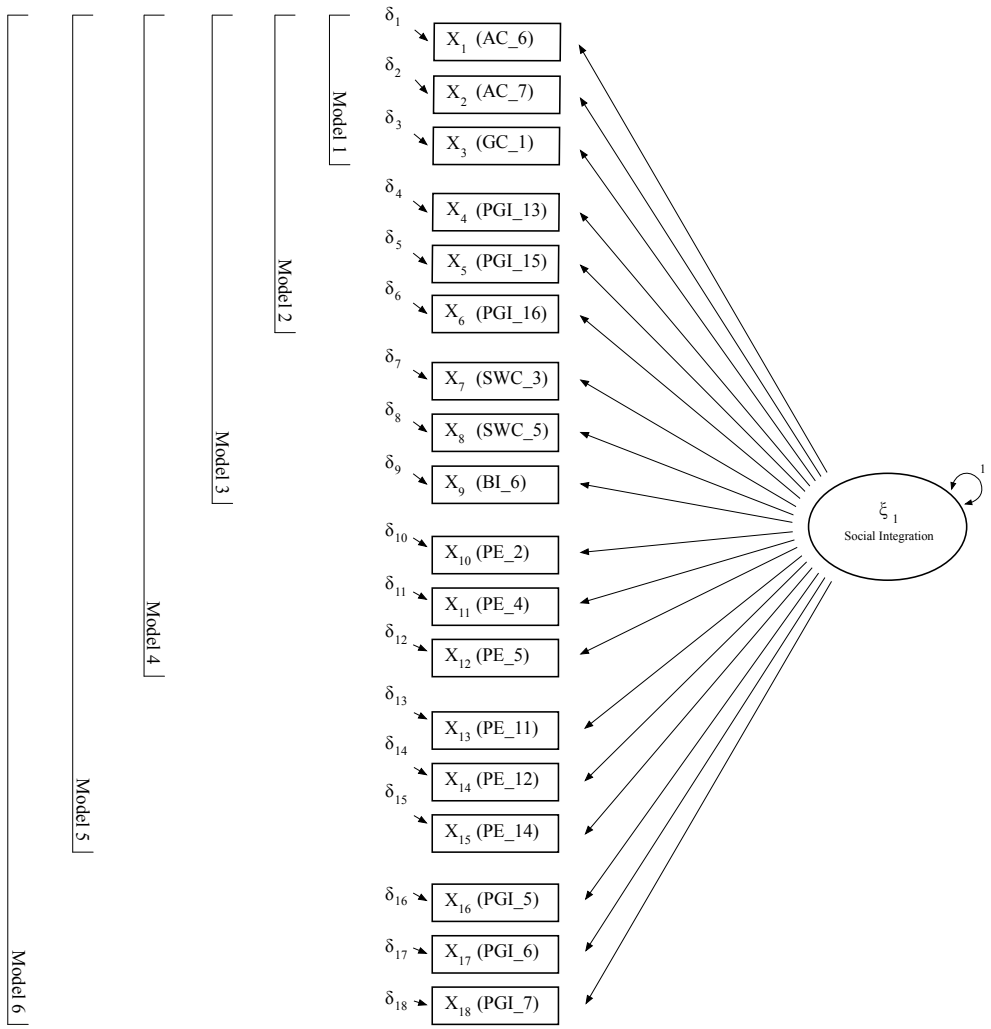

Figure 16. Specification of the CFA Higher-Order Factor Measurement Models

Finally, the descriptive statistics of the proposed subscales in both samples are presented in Table 18. As the data has been classified as ordinal for the purposes of all analyses, descriptive statistics of this nature have no meaning. However, as data on Likert-type 5-category/point response scales is often classified as interval in nature, these descriptive statistics are reported here as reference for the reader. The inclusion of statistics such as the Cronbach (1951) alpha is ubiquitous when reporting scale reliability, and the alpha statistic informed in part the choice of the items that made up the initial 72-item pool.

The full final scale demonstrated good Cronbach (1951) alphas in both the *calibration* ($\alpha = .95$) and *validation* samples ($\alpha = .94$). Considered in isolation, these alpha values for the full scale might give the impression that this is a well-performing unidimensional measure,

whereas the preceding analyses (see Figure 15 and Table 17) have demonstrated that these 18 items are in fact not adequate indicators of a single higher-order latent variable, *social integration*, despite the face value of the high correlations between items and thus alpha values of greater than .90. What is clear, however, is that the proposed items of the Social Integration Scale are highly effective indicators of sub-constructs of *social integration*.

Table 18

Descriptive Statistics of the Social Integration Scale

Factor	Variable	Calibration Sample (N_1)					Validation Sample (N_2)				
		M	*SD*	Min	Max	α	*M*	*SD*	Min	Max	α
Group Attachment	AC_6	3.19	1.08	1	5	.89	3.39	1.03	1	5	.86
	AC_7	3.28	1.02	1	5		3.51	0.94	1	5	
	GC_1	3.57	1.04	1	5		3.74	0.91	1	5	
Perceived Authenticity	PGI_13	3.38	0.98	1	5	.98	3.50	0.94	1	5	.97
	PGI_15	3.35	0.99	1	5		3.53	0.94	1	5	
	PGI_16	3.39	1.01	1	5		3.57	0.93	1	5	
Behavioural Integration	SWC_3	3.15	1.08	1	5	.87	3.26	1.01	1	5	.86
	SWC_5	3.29	1.09	1	5		3.56	0.99	1	5	
	BI_6	3.42	1.04	1	5		3.50	1.00	1	5	
Perceived Control	PE_2	3.63	1.09	1	5	.87	3.78	1.05	1	5	.85
	PE_4	3.76	1.02	1	5		3.92	0.82	1	5	
	PE_5	4.04	0.89	1	5		4.09	0.79	1	5	
Goal Internalisation	PE_11	3.67	1.01	1	5	.94	3.75	0.87	1	5	.93
	PE_12	3.84	0.92	1	5		3.91	0.80	1	5	
	PE_14	3.77	0.98	1	5		3.92	0.87	1	5	
Group Affection	PGI_5	3.60	0.84	1	5	.93	3.73	0.74	1	5	.90
	PGI_6	3.67	0.90	1	5		3.78	0.81	1	5	
	PGI_7	3.65	0.83	1	5		3.73	0.77	1	5	

Note. N_1 = 310; N_2 = 310; α = standardised Cronbach (1951) alpha; AC = Affective Commitment; GC = Group Cohesion; SWC = Satisfaction with Co-Workers; BI = Behavioural Integration; PGI = Perceived Group Inclusion; PE = Psychological Empowerment

CHAPTER FIVE: DISCUSSION

The aim of the present research, as stated in the research question, was to bring clarity to the construct of workgroup *social integration*. In this chapter the findings of the research are interpreted, namely the alignment between the results (Chapter Four) and the initial working conceptualisation of *social integration* (Chapter Two). The generalisability of the findings as well as the contextual nature of the research are examined. Contributions to knowledge and practice, assumptions and limitations associated with the present research, and recommendations for future research are also discussed.

5.1. Interpretation of Findings on Content and Dimensionality

A review of the organisational diversity literature revealed that *social integration* was inconsistently defined and often described as a higher-order or nested construct, subsuming several first-order latent variables (Brunner, et al., 2012). In total, six themes used in definitions of *social integration* were identified: *group attachment* (an "umbrella" term, subsuming *group identification* and *affective commitment*), *group cohesion*, *satisfaction with co-workers*, *behavioural integration*, *quality of social relations*, and *perceived group inclusion*. A seventh theme (*psychological empowerment*) was included in the study, based on a theoretical argument relating to the South African national and organisational context. Following analysis, workgroup *social integration* in the South African context was posited to be a higher-order latent variable consisting of six aspects: *group attachment*, *perceived authenticity*, *behavioural integration*, *perceived control*, *goal internalisation* and *perceived group affection*.[3] An 18-item scale of *social integration* was proposed on the basis of these results (see Figure 15).

Four of the six aspects of workgroup *social integration* were identical to the seven themes identified in prior literature, i.e. *perceived authenticity*, *perceived control*, *goal internalisation* and *perceived group affection*. The remaining two aspects of were slightly

[3] It is noted that there are alternative approaches to the challenge of achieving measurement precision within organisational psychology. The present research has adopted the proposition that measurement of a construct must be examined broadly to obtain non-redundant, stable indicators (at any level of detail) to support further research and theory development. A counterargument, such as Bandwidth-Fidelity Theory, proposes that the use of narrow constructs/indicators rather than the assessment of broader/hierarchical constructs, may more precisely uncover underlying psychological theory, generate more accurate models, and aid the aims of future research (Judge & Kammeyer-Mueller, 2012).

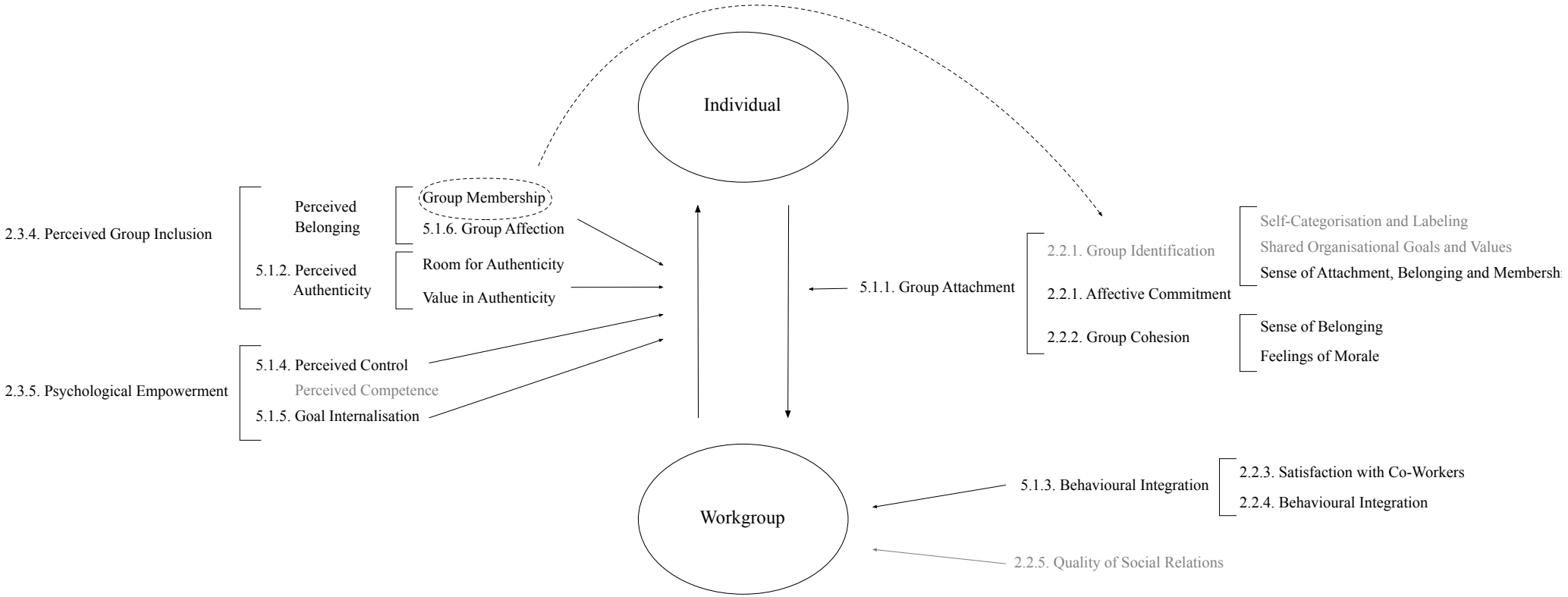

Figure 17. Summary of Findings on Content and Dimensionality of Workgroup Social Integration in the South African Context

redefined, i.e. *group attachment* and *behavioural integration*. Some themes originally theorised to be a part of *social integration* failed to feature in the final model of the construct, i.e. *quality of social* relations, the *perceived competence* dimension of *psychological empowerment*, and conceptualised aspects of *group identification*. Finally, some theorised themes, while remaining intact, were subsumed by other aspects of the final model, i.e. *group cohesion* and the *group membership* component of *perceived group inclusion* fell under the "umbrella" of *group attachment*, which as discussed above was thus slightly redefined. The findings on content and dimensionality are summarised diagrammatically in Figure 17.

Figure 17. is based on Jansen, et al.'s (2014) diagrammatic presentation of the contrasting theory of *perceived group inclusion* and *social identification* (Figure 18). As discussed in Section 2.3.4., whereas in *social identification* the individual holds agency with respect to group membership, in Inclusion Theory the opposite is so. The vertical arrows in Figure 17 thus refer to these contrasting processes involved in group membership. The various themes identified in prior literature as well as the outcomes of the present research have been classified according to this idea of where agency lies. Exceptions to this classification are *behavioural integration*, *satisfaction with co-workers* and *quality of social relations*, which can be broadly described as individuals' perceptions of group functioning. In greyed text are themes identified in the literature review that fell away in analysis and have not been included in the final model of the construct.

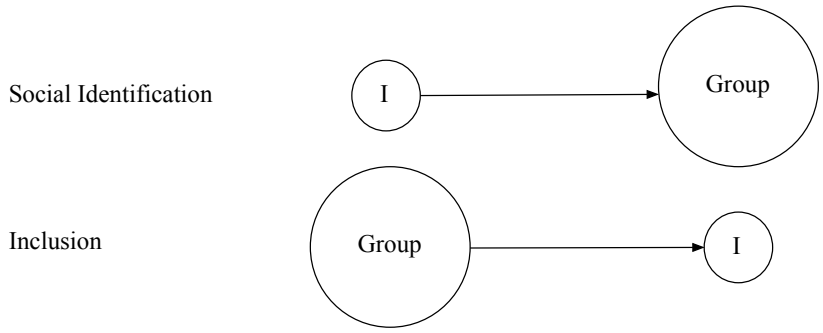

Figure 18. Reproduction of Jansen, et al.'s (2014) "Figure 1: The individual-group relationship in social identification and inclusion"

Thus, each of the proposed aspects of workgroup s*ocial integration* represented individuals' perceptions: of the extent to which the workgroup includes and empowers the individual; of the extent to which the individual feels attached to the workgroup; and of the

extent to which the workgroup climate is constructive and satisfactory. These overarching distinctions are also evident visually in Figure 17. With this overview in mind, the six aspects of workgroup *social integration* in the South African context are presented in more detail.

5.1.1. Group attachment. *Group attachment* emerged as a facet of *social integration*. It includes a feeling of emotional attachment to the workgroup, a sense of belonging to the workgroup, and the workgroup holding personal meaning for the individual. *Group attachment* thus expresses an affective affiliation with the workgroup, including the feeling of having strong ties with one's workgroup, feeling like "part of the family", feeling that one is a member and/or a part of one's workgroup, a feeling that one fits in, and feeling enthusiastic about one's workgroup.

This conceptualisation of *group attachment* differs to that proposed in the literature review (Section 2.2.1) in terms of its scope. The theoretically derived conceptualisation drew on Guillaume, et al.'s (2012) description of *group attachment* as an umbrella term, subsuming *affective commitment* and *group identification*. Prior research has tended to treat these two constructs as distinct, however the obvious conceptual overlap has been commented on for some time (Edwards & Peccei, 2007). The data in this study suggest that *group attachment* includes not all, but only the affective component of *group identification*: *sense of attachment, belonging and membership of the group*. The confirmation of this overlap is thus not a surprising finding. This is illustrated in Figure 17 where greyed text is used to indicate the aspects of *group identification* that did not form a part *group attachment.*

Additionally, *group attachment* was found to be indistinguishable from *group cohesion*, particularly with regards to a *sense of belonging*. This marks a distinct shift in theory, as *group cohesion* has tended to be included as a distinct facet of *social integration* in previous research (e.g. Lin & Shih, 2008; Newell, et al., 2008; O'Reilly, et al., 1989, Rico, et al., 2007). Harrison, et al. (2008) identified *group cohesion* as affective in nature, just as *group attachment* was in this study. This latent variable could thus equally have been named *group cohesion*. The decision to refer to *group attachment* instead of *group cohesion* was taken because *affective commitment* and the closely related affective *group identification* scale items were the best predictors of the latent variable. It could also be argued that the term *group attachment* has a clearer meaning and references the theorised agency of the individual associated with this construct, thus rendering it a more effective label.

Finally, as indicated in Table 6 and Figure 17, *group membership* which had been included as a part of *perceived group inclusion* also emerged as an aspect of *group attachment*. Jansen et al. (2014) had clearly defined *perceived group inclusion* as being based on the group exercising agency, in contrast to the social identification process that leads to *group identification*, in which the individual holds agency. These fundamental conceptual distinctions are illustrated in Figures 17 and 18 with arrows between individual and group on the vertical axis. Thus, this finding could be interpreted as a conceptual shift in relation to Inclusion Theory. Alternatively, as Bollen and Hoyle (1990) have stressed when interpreting latent variable analyses, it is possible that feelings of group membership and belonging directed from the individual towards a workgroup, and the individual perception that the workgroup accepts one as a member (i.e. one "belongs") are conceptually distinct but empirically indistinguishable. As described in Section 2.4.2. Bollen and Hoyle (1990) use the example of height and weight to illustrate this possibility, where two closely related observed variables may appear as one latent variable in a model, but one would not conclude that height and weight are indistinct in reality. Thus, *group identification*, *affective commitment*, *group cohesion* and *group membership* (a subscale of *perceived group inclusion*) contained conceptual overlaps, or redundancies, that became apparent in this analysis.

5.1.2. Perceived authenticity. *Perceived authenticity* describes the individual experience that one is allowed and/or encouraged by the workgroup to express one's authentic self, due to there being *room for authenticity* and *value in authenticity*. The construct had been defined in line with Jansen, et al. (2014) who saw *perceived authenticity* as a part of *perceived group inclusion* (see Figure 17, Section 2.3.4. and Section 3.4.7.). The value that the workgroup was seen to place on authenticity was the most effective indicator of *perceived authenticity* in this study.

The other half of *perceived group inclusion*, *perceived belonging*, was assumed to subsume *group membership* and *group affection*. As described in Section 5.1.1., *group membership* survived the EFA performed in Section 4.3., as did *group affection* (see Section 5.1.6. for an interpretation of this finding). The role of Inclusion Theory in the formation of *social integration* had been previously theorised, for example in Blau's (1960) Theory of Social Integration, but had not been measured or tested empirically. Blau (1960) stressed that it is not enough for an individual to be attracted to a group, but that the group must also be attracted to the individual for *social integration* to develop. Inclusion Theory subsequently explored the nature of this group-individual attraction in far more detail.

5.1.3. Behavioural integration. The *behavioural integration* dimension that emerged in the present research is aligned with definitions in prior literature as individuals' perceptions of collaborative behaviour, information exchange and joint decision-making (see Section 2.2.4.). Based on the findings of this study, however, it also includes individuals' satisfaction with their co-workers, the way the workgroup functions, its leadership, communication between group members and with the relationship climate. Workgroups with high *behavioural integration* are perceived as having good interpersonal relationships, with members sticking together and cooperating to help one another.

Notably, social interaction amongst members outside of the workplace did not feature as a part of *behavioural integration*. This finding contributes to theory by the exclusion of this idea, limiting the experience of workgroup *social integration* to the workplace. References to social interaction beyond the work space and role boundaries are found in the measures of *social integration* of O'Reilly, et al. (1989) and Lin and Shih (2008), as described in Section 2.2.5. (see Appendix A). Thus, rather than social interaction beyond the workplace, relationship climate at work, levels of cooperation between colleagues and perceptions of workgroup functioning emerged as meaningful aspects of *behavioural integration* and therefore *social integration.*

5.1.4. Perceived control. *Perceived control* includes individuals' perception that they have the authority to work effectively and make decisions at work, that they can influence work and decision-making within the workgroup, and that important responsibilities are a part of the work role. *Perceived control*, described by Menon (2001) as a facet of employee *psychological empowerment*, emerged as a dimension of *social integration* not previously proposed or measured in the existing literature. Given South Africa's discriminatory past, it had been assumed that *psychological empowerment* would be a crucial factor in the formation of *social integration* in workgroups (see Section 2.3.5.). This finding was thus aligned with that theoretical proposal, suggesting that an important facet of *social integration* is omitted when *perceived control* is overlooked.

5.1.5. Goal internalisation. *Goal internalisation* describes the perception that workgroup goals, objectives and success, and one's contribution towards them generates inspiration and enthusiasm on a personal level. *Goal internalisation* is a dimension of *psychological empowerment*, drawn conceptually in part from ideas about transformational leadership, in that it assumes that a sense of personal energy and enablement derive from an

internalised group vision (Menon, 2001). Viewed as a part of *social integration* theory, *goal internalisation* can be understood as a form of psychological connection between individual and group, where the group holds agency by aligning group goals with individual passions. The group may do this by, for example, creating an environment the individual feels inspired by, and by choosing members who will easily internalise existing group objectives.

Interestingly, the third assumed part of employee *psychological empowerment*, *perceived competence*, did not emerge as a dimension of *social integration. Perceived competence* describes individuals' perceptions of their own competence in the work role, i.e. possessing the skills, abilities and competencies to work well, efficiently and effectively at work (Menon, 2001). This finding would seem to indicate that levels of *perceived competence* are less important in the development of workgroup *social integration,* or that greater workgroup *social integration* does not predict increased *perceived competence*.

5.1.6. Group affection. *Perceived group affection* emerged as a facet of *social integration* and included the perception that one is liked and appreciated by the workgroup, and that the workgroup is pleased with and cares about one. *Group affection* as it emerged in the present research is identical to Jansen, et al.'s (2014) conceptualisation of the same construct as a part of *perceived group inclusion*.

In summary, *social integration* is conceptualised as a psychological connection between individual and workgroup, a multi-faceted phenomenon reflecting:

1. individual attachment to the group, experienced as emotional attachment, a sense of belonging, and perceived group membership;
2. perceived authenticity, the experience that the group allows and values individual authenticity;
3. behavioural integration within the group, experienced as perceptions of and satisfaction with various positive attributes of functional groups;
4. perceived control or agency, experienced as autonomy allowed by the group;
5. personal energy gained from internalisation of the group's goals and objectives; and
6. perceived group affection, the experience that the group likes, appreciates and cares about the individual.

Thus, in workgroups in South Africa with high levels of *social integration*, members:

1. feel emotionally attached to the group;
2. feel their authentic selves are valued and accepted by the group;
3. view the behaviour of members as indicative of positive group functioning;
4. feel they have autonomy within the workgroup;
5. experience an alignment between personal and group goals; and
6. feel liked and cared about by the group.

5.2. The Context and Theory Interface

The South African national context formed the basis of an argument for the inclusion of *psychological empowerment* (comprised of *perceived control*, *perceived competence* and *goal internalisation* subscales) in the present research. The contextually-motivated inclusion of this theory led to the conclusion that *perceived control* and *goal internalisation* were facets of *social integration,* but that *perceived competence* was not.

Some authors would argue that due to the social, relational nature of human existence, the impact of context is so important that context analysis should be a central facet in all organisational research, whereas others posit that universal, fully generalisable, context-free theories are of superior scientific merit (Cheng, 1994; Johns, 2006; Whetten, 2009). Whetten (2009) suggests that the interface between theory and context can be viewed in terms of theories in context ("context specificity") or theories about context itself ("context sensitivity"). Thus, the practice of exploring theoretical developments with a conscious approach towards context can add value, as potential differences and inconsistencies facilitate the generation of refined theoretical perspectives (Whetten, 2009).

While context may have motivated the inclusion of *psychological empowerment*, it is not possible on the basis of a single study to clarify the delineation between contributions to a universal or core theory of *social integration*, and contributions to theory of context as it applies to *social integration*. For example, if the exploratory approach used in the present research was repeated in a sample of employees in another country, and *perceived control* and/or *goal internalisation* did not emerge as facets of *social integration*, it may then be reasonable to begin speculating about the possible influence of context when discussing the findings of the present research. CFA models of *social integration* including or excluding *perceived control* and/or *goal internalisation* could be assessed for comparative fit, as well as

for measurement invariance between groups from different national contexts. Context effects considered relevant can also be quantified (e.g. *age*, *socio-economic status*, *individualism/collectivism*, *power distance*) and assessed for influence as a variable acting on a construct, in this case *social integration* (Gerhart, 2008).

Another potential contextually-bound example is the exclusion from *social integration* of theory about socialisation with group members outside of the work context. These ideas could be viewed as contextually-bound theory, stemming from North American (workplace) culture, in which socialisation outside of the workplace might hold greater significance – perhaps seen as an extension of the positive working relationship in a way that it is not in the South African context (O'Reilly, et al., 1989).

5.3. Contributions to Theory and Practice

As described in detail in Section 5.1. and illustrated in Figure 17, the present research contributed to theory by advancing conceptual clarity of the content, dimensionality and measurement of *social integration* in the South African workplace context.

Social integration is widely approached as a single variable in existing research, even when sub-constructs are proposed, i.e. a single *social integration* score is calculated (e.g. Harrison, et al., 2002; Lin & Shih, 2008; O'Reilly, et al., 1989; Van der Vegt, 2002). The findings of the present research did not support the practice of homogenising the distinct experiences that make up *social integration* in this manner. In addition to the lack of evidence that the 18 indicators included in the proposed Social Integration Scale (Figure 15) are adequate indicators of *social integration* (as opposed to the six sub-constructs thereof), this approach does not allow for the investigation of differing relationships between dimensions of *social integration* and other variables in research.

The present research constituted the initial phase of the development process of a scale of *social integration* (Hinkin, 1998). Thus, the formative contribution made by the present research to theory cannot be considered a sufficient evidence base from which to direct practice. The present study may, however, bring to the attention of practitioners the need to further explore and/or clarify personal and professional assumptions regarding what constitutes *social integration* in the workplace.

Research has shown that social integration in South African workplaces and other social contexts is lacking (see Section 1.3.). Without a clear understanding of the elements

that define *social integration* at work, effective inclusion management within organisations is diminished. This study thus forms a starting point, demonstrating which employee experiences organisations need to focus on to encourage workplace *social integration*, namely *group attachment*, *perceived authenticity*, *behavioural integration*, *perceived control*, *goal internalisation* and *perceived group affection*.

Encouraging *social integration* at work may have broader social implications, too. An individual may, by experiencing a *socially integrated* workgroup, gain an appreciation for the perspectives of people different to themselves, but not form friendships with co-workers. Facilitated by a healthy workplace, an increased understanding of and respect for diverse individuals may, however, influence an individual's ability to connect with a diverse community beyond the work space and role. This level of speculation would require further research, developing theory on the influence of *social integration* in one sphere of life (the workplace) on the broader social integration in other shared spaces within South Africa.

5.4. Assumptions and Limitations Associated with the Research

Several assumptions and limitations impact the accuracy with which the findings of the present research can be interpreted. On the most basic level, the 72 items and various other information presented to the research participants in English was assumed to be a standardised form of measurement. In reality, the level of English-proficiency may have varied (Foxcroft & Roodt, 2009) and interaction with the survey platform could have differed slightly in performance between devices (Qualtrics, 2017).

All findings were based on the creation of mathematical models, i.e. EFA and CFA models, both of which are variations on the linear common factor model detailed in Chapter Four (Flora, et al., 2012). These models were intended to provide a meaningful approximation of the complex realities present in datasets. Interpretation thereof was thus limited by the quality of the mathematical models generated and applied in analysis, which are always inaccurate to some extent (MacCallum, 2003). The models generated were assumed, while imperfect, to be sufficiently accurate descriptions of the samples under analysis. While some confirmatory evidence was provided in the present research to support the generalisability of models generated by exploratory analysis, further research is necessary in order to mitigate this limited evidence base (Cudeck & Henley, 1991).

All findings of the present research were based on two samples, created by randomly splitting a single initial sample in two, and have not yet been replicated in other samples. Hinkin's (1998) scale development guidelines, applied as a framework, were thus not completed and further developmental research is recommended in two key areas: (1) the generation of an evidence base regarding the convergent/discriminant/nomological validity of *social integration*, and (2) iterative replication of the findings of the present research (discussed in Sections 5.2. and 5.3.). Thus, in addition to the limitations of the mathematical models employed, this incomplete research cycle limits the extent to which one can be reasonably certain that the models presented herein can be assumed to reflect the identified population, rather than merely the two samples at hand.

The limitations of the sampling strategy itself limit the extent to which the findings based on samples analysed in the present research can be generalised to the population described in Section 3.3. The population sampled in this study was defined as all employees working in South African organisations (irrespective of their own nationality). Sampling was non-randomised and a convenience sampling strategy was adopted due to resource limitations. Thus, the model of *social integration* generated and confirmed in the present research, as well as the accompanying theoretical contributions thereof, cannot necessarily be assumed to reflect the population model without further research. Additionally, no population is without context, in this case the South African working environment (see Section 5.2). For example, although not specified as a target population for sampling, it is believed that many of the research participants were drawn from public South African universities. The model of *social integration* developed in this context may not adequately fit samples drawn from, for example, dissimilar organisational contexts, or generalise to a dissimilar demographic profile.

The findings of the present research have not been linked speculatively to any descriptive information about the samples at hand, for example, the working conditions of participants (believed to be largely university employees, the majority of whom occupied permanent middle or senior management positions) or the average level of education (the majority of the sample held either a Masters or PhD qualification). This choice was made because such speculation would not have been aligned with the research aims/question posed herein, and would have required a means of comparison that was unavailable at this point in the research cycle. For example, neither descriptive nor inferential analyses of response differences between groups were presented in the results of Chapter Four.

5.5. Recommendations for Future Research

Recommendations for future research address the limitations described above. In line with Hinkin's (1998) recommendations, further research could investigate discriminant/convergent validity, i.e. the relationships between *social integration* and surrounding constructs in a theorised nomological network. This process would establish whether or not the resultant conceptualisation of *social integration* behaves as theorised, strengthening the validity of the construct (Hinkin, 1998; Messick, 1995). Hinkin's (1998) sixth step indicates that the model of *social integration* proposed in the present research should also be tested for replication in other samples. Although the population sampled in the present research was described broadly, the sample was highly specific in some respects, (e.g. the level of formal education was very high) but not in others (e.g. participants reported a broad, balanced age range). If the model was demonstrated to fit other samples adequately (e.g. further segmented or general South African employee populations, populations in similar/dissimilar national contexts, populations in post-conflict or post-Colonial societies), the process of replication in similar and dissimilar populations would gradually contribute to the validity of the scale and model of *social integration* in the South African context (Hinkin, 1998; MacCallum, 2003; Preacher, et al., 2013).

Clarity on how best to measure *social integration* may also be furthered, even within the existing samples presented in the present research. Provided that the proposed scale of *social integration* demonstrates measurement invariance, meaningful differences between groups could be assessed where sufficient data is present. For example, differences between language groups to assess the data for possible effects that may be attributable to participants' first-language, or differences between racial groups to establish measurement equivalence and possible interpretation of relative group scores (at the level of the sub-constructs).

Finally, Chapter One described *social integration* as a key variable in the workplace diversity literature, an area of research where conceptualisation and measurement of diversity itself has been noticeably inconsistent (Harrison & Klein, 2007). If a sufficiently stable model of *social integration* in the South African context is developed, the highly topical research agendas of the workgroup diversity stream in which the construct is situated may also be further explored in, and adapted to, the South African context. In addition to further academic research, a key motivation in commencing the development of a Social Integration Scale appropriate to the South African context was to provide practitioners with a tool that can be used in local organisations. As described in Section 1.3., such a tool would align with the

challenges that face South African organisations and organisational psychologists, namely the demographic integration of the national workforce, as mandated by South African legislation and reported on annually by the Commission for Employment Equity (CEE) (Department of Labour, 2015). In addition to the present objective indicators of this process of integration (e.g. race/gender statistics), a Social Integration Scale allows organisational psychologists and other organisational development professionals to better examine the subjective experience of integration, both by providing a monitoring and evaluation tool, and by articulating a vision of what an individuals' subjective experience of a demographically and socially integrated workplace is (Department of Labour, 2015). As highlighted in Section 1.3., the strategic direction of the CEE's work can be summarised as follows:

> "I am excited to share that the Commission's strategic plan for the period 2016 to 2021 has prioritised the need to go beyond workforce demographic statistics and move towards a better understanding of the experience of fair treatment, diversity and "inclusion" Management." Tabea Kabinde (CEE Chairperson, 2015/16) (p. vii)

5.6. Conclusion

Social integration was expanded and clarified in both content and dimensionality to reflect the South African context and develop theory more generally. The present research has contributed meaningful information on how to measure *social integration* in the South African workplace, but the proposed scale remains in the early stages of development. Further research is thus required before the findings presented herein may be considered robustly well-evidenced or broadly generalisable.

Despite these limitations, the proposed scale contributes meaningfully to an indigenous knowledge base in a highly relevant area of organisational psychology in South Africa. The presence of research exploring pivotal issues such as workplace *social integration* undoubtedly adds practical value. This underscores a growing interest in employee welfare and experience, a focus in and of itself that has value beyond potential connections to employee performance. Most significantly, *social integration* provides a clearer understanding of a group state which practitioners aspire to encourage - shifting the focus from perceived problems and impediments to *social integration*, to a clear, concise and accurate vision of what defines the individual experience of workplace *social integration.*

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Appendix A

Examples of the Conceptualisation and Operationalisation of Social Integration in Organisational Settings (Peer-Reviewed Literature)

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Work group demography, social integration, and turnover.	1942	O'Reilly, Caldwell, & Barnett (1989)	"A multifaceted phenomenon that reflects attraction to the group, satisfaction with other members of the group, and social interaction among the group members"	Three measures were used (with reference to teams): 1) Cohesiveness Index (4-items) 2) Satisfaction with co-workers 3) Participants asked to indicate the number of times they had socialised with others away from work within the previous month. Cronbach alphas indicated. Unidimensionality assumed and scores for the 3 measures summed. Group-level index of social integration generated by averaging individual scores in each of 20 groups.
Top management team demography and process: The role of social integration and communication.	1769	Smith, Smith, Olian, Sims, O'Bannon, & Scully (1994)	"Social integration is a multifaceted phenomenon that reflects 'the attraction to the group, satisfaction with other members of the group, and social interaction among the group members'"	Individual perceived social integration was measured by a unidimensional 9-item scale (5-point) adapted from Shaw (1981). Cronbach alphas indicated. Unidimensionality assumed. Team social integration scores were aggregated by organisation, the unit of analysis in the study (of which 53 participated).
Beyond relational demography: Time and the effects of surface- and deep-level diversity on work group cohesion.	1975	Harrison, D. A., Price, K. H., & Bell, M. P. (1998)	"… the degree to which group members are psychologically linked or attracted toward interacting with one another in pursuit of a common objective. In the present study, we concentrated on the primary affective dimension of social integration, group cohesiveness."	Seashore's (1954) 3-item group cohesiveness measure, as used by O'Reilly, et al. (1989). Cronbach alphas indicated. Individual scores aggregated to the group level (71 teams).

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Should we create a niche or fall in line? Identity negotiation and small group effectiveness.	215	Swann, W. B., Milton, L. P., & Polzer, J. T. (2000)	Connectedness to groups is a function of identity negotiation and self-verification efforts.	An adapted version of Smith, et al.'s (1994) 9-item scale (7-point). Internal consistency indicated (.82) and unidimensionality assumed on this basis. A *composite connectedness to group* variable was created in this study by combining responses to group identification, emotional conflict and social integration scales. Unidimensionality assumed (alpha = .78). In total, 83 groups.
Openness to dissimilarity moderates the consequences of diversity in well-established groups.	33	Fujimoto, Y., Hartel, C. E. J., Hartel, G. F., & Baker, N. J. (2000)	Not defined.	An adapted version of Smith, et al.'s (1994) 9-item scale (5-point). Cronbach alpha indicated. Unidimensional scale formed by averaging item scores. Analyses conducted at group level (of which there were 27).
Time, teams, and task performance: Changing effects of surface- and deep-level diversity on group functioning.	1357	Harrison, D. A., Price, K. H., Gavin, J. H., & Florey, A. T. (2002)	"Our use of this term is similar to its use by O'Reilly and his coauthors (1989) and by Smith, Smith, Olian, Sims, O'Bannon, and Scully (1994). For these researchers, team social integration is a multifaceted construct including elements of cohesiveness, satisfaction with coworkers, positive social interaction, and enjoyment of team experiences" (p. 1032)	Five measures were used (with reference to teams): 1) 3-item Cohesiveness Index 2) 3-items measuring satisfaction with team 3) 2-items measuring fairness (procedural justice) 4) Participants indicated their willingness to work with each other in future 5) A measure of attraction toward other team members Measures were highly correlated (*r*'s = .65-.75) and were standardized and combined to create a composite score for social integration (α = .91). Unidimensionality assumed. Individual responses aggregated to the group level (144 teams).

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Effects of attitude dissimilarity on social integration: A longitudinal panel study.	46	Van der Vegt, G. S. (2002)	"… social integration is a multifaceted phenomenon that reflects the extent to which an individual team member experiences cooperative social interaction with the other group members, attraction to the group, and satisfaction with the other group members (O'Reilly, Caldwell, & Barnett, 1989)" (p. 440)	A 6-item (5-point) Social Integration Scale, measuring perceptions of collaborative behaviour (3-items) and identification and commitment (3-items). CFAs offered in support of unidimensional structure. Cronbach alphas indicated. Author identifies behavioural (e.g. perceived cooperative behavior and communication) and affective dimensions (e.g. cohesion and attraction to the group). In total, 25 groups.
Capitalizing on diversity: Interpersonal congruence in small work groups.	653	Polzer, J. T., Milton, L. P., & Swann, W. B. (2002)	"Social integration refers to the degree to which group members are attracted to the group, feel satisfied with other members, interact socially with them, and feel psychologically linked to one another (Katz and Kahn, 1978; O'Reilly, Caldwell, and Barnett, 1989; Smith, et al., 1994)" (p. 301)	An adapted version of Smith, et al.'s (1994) 9-item scale (7-point). Internal consistency indicated (.82) and unidimensionality assumed on this basis. Individual responses aggregated to the group level (83 teams).
Perceived deep-level dissimilarity: Personality antecedents and impact on overall job attitude, helping, work withdrawal, and turnover.	94	Liao, H., Chuang, A., & Joshi, A. (2006)	Not defined.	6-item Van der Vegt (2002) Social Integration Scale. Internal consistency indicated (.89) and CFA evidenced the presence of a single latent variable, distinct from *affective commitment to the workgroup* and *coworker satisfaction* (p.113). All scales back-translated into Chinese. Individual level of analysis. Used in a pilot study criterion-related validity exercise.

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Effects of team inputs and intrateam processes on perceptions of team viability and member satisfaction in nascent ventures.	128	Foo, M-D., Sin, H- P., & Yiong, L-P. (2006)	"Social integration is a multifaceted phenomenon that includes social interaction, group pride, and spirit (Smith et al., 1994). Teams high in social integration experience higher member satisfaction, do better at coordinating tasks" (p. 392)	Smith, et al.'s (1994) 9-item, 7-point scale. Measured separately to *perceived team viability, open communication* and *member satisfaction*. Internal consistency evidenced (.69) but no evidence of construct validity. Individual scores aggregated to the team level (51 teams)
The effects of diversity faultlines and team task autonomy on decision quality and social integration.	171	Rico, R., Molleman, E., Sanchez-Manzanares, M., & Van der Vegt, G. (2007)	"Social integration reflects the degree to which team members feel satisfied with and committed to team interactions and their willingness to stay in the team" (Rico, et al., 2007, p. 115)	"Following Harrison et al. (2002), we used satisfaction and cohesion items to assess the extent of team social integration" (p. 120) 1) 3-item Satisfaction with Co-workers Scale 2) 7-item Cohesion Scale (Stokes, 1983) Measures correlated highly (r = .79) and were combined to create a composite measure (α = .89). Measure aggregated to the group level of analysis (52 teams).
The effects of team diversity on team outcomes: A meta-analytic review of team demography.	884	Horowitz, S. K. & Horowitz, I. B. (2007)	"Team member satisfaction reflecting the degree to which members of a team enjoy their working relationships, whereas team cohesion refers to the extent to which team members attempt to remain intact to achieve team goals" (Horowitz & Horowitz, 2007, p. 995).	1) Team member satisfaction 2) Team cohesion Group level of analysis (e.g. excluding firm-level performance).

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Leveraging e-identities: The impact of perceived diversity on team social integration and performance.	15	Newell, J., Maruping, L., Riemenschneider, C., & Robert, L. (2008)	"Social integration reflects the degree to which team members feel 'psychologically linked' to other team members while trying to achieve a shared goal"	Three measures were used (with reference to teams), but were treated as one construct dues to high correlations and the results of principal components analysis ($\alpha = .96$): 1) Cohesiveness Index 2) Job Descriptive Index (coworker satisfaction) 3) Willingness to work with the team in future
How executive SHRM system links to firm performance: The perspective of upper echelon and competitive dynamics.	86	Lin, H-C., & Shih, C-T. (2008)	"Social integration assesses the degree of psychological attachments among team members (O'Reilly, Caldwell, & Barnett, 1989). Social integration is a team-level … construct" (p.856) Operationally defined as consisting of group member cohesion, team satisfaction and social interaction.	A 10-item scale was generated by drawing on Seashore's (1979) Team Cohesion Scale, Van der Vegt, et al.'s (2001) 3-item Team Satisfaction Scale, 1 item from Smith, et al.'s (1994) Social Integration scale, and 2 items generated from interviews. CFA confirmed a three-factor model and subscales as well as the full scale demonstrated adequate Cronbach alphas. Correlations between subscales were .73, .85, and .91, "providing evidence for social integration as a metaconstruct" (p.863) Data analysed at the firm level.
Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership.	388	Jansen, J. J. P., George, G., van den Bosch, F. A. J., & Volberda, H. W. (2008)	"Social integration is a multifaceted phenomenon that reflects the 'attraction to the group, satisfaction with other members of the group, and social interaction among the group members' (O'Reilly, et al., 1989, p. 22)" (p. 987)	7 items adapted from the Smith et al. (1994) Social Integration scale ($\alpha = .77$). Unidimensionality evidenced with EFA and CFA as well as convergent/discriminant validity (distinctiveness from other similar constructs in use in the study).

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Structural differentiation and ambidexterity: The mediating role of integration mechanisms.	666	Jansen, J., Tempelaar, M., van den Bosch, F., & Volberda, H. (2009)	"Social integration is a multifaceted phenomenon that reflects the 'attraction to the group, satisfaction with other members of the group, and social interaction among the group members' (O'Reilly et al. 1989, p.22)."	Four-item measure adapted from previous studies (Smith, et al., 1994, O'Reilly, et al., 1989) capturing "attraction to senior management members, satisfaction, and social interaction among team members" (p. 804) (α = .73). Unidimensionality, convergent/discriminant validity evidenced by CFA.
Unravelling the effects of cultural diversity in teams: A meta-analysis of research on multicultural work groups.	583	Stahl, G. K., Maznevski, M. L., Voigt, A., & Jonsen, K. (2010)	Social integration is "the attraction to the group, and social interaction among group members" (O'Reilly, Caldwell, & Barnett, 1989, p. 22) Includes cohesion, collaboration, coordination, satisfaction, attraction, morale and trust.	Measured/analysed as a separate variable to conflict (task, relationship and process), communication effectiveness and satisfaction.
Why turnover matters in self-managing work teams: Learning, social integration, and task flexibility.	74	Van der Vegt, G. S., Bunderson, S., & Kuipers, B. (2010)	"Social integration is a key indicator of the *groupiness* of a group (Moreland & McMinn, 2004). It is evidenced by 'attraction to the group, satisfaction with other members of the group, and social interaction among the group members' (O'Reilly et al., 1989: 22)" (p. 1172)	A 3-item Social Integration Scale (5-point), measuring team cohesiveness, behavioural integration and personal satisfaction with the team. Scale validated against the 6-item Van der Vegt (2002) Social Integration scale from a validation study amongst 94 MBA students. CFA confirmed a single latent factor and the two scales were highly correlated (r = 76). The construct was deemed unidimensional. Convergent/discriminant validity also supported by CFA (a 3-factor model tested with *social integration* alongside *task flexibility* and *learning behavior*).

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Group cohesion and performance: A search for antecedents.	1	Kaymak, T. (2011)	"Social integration is defined as 'the attraction to the group, satisfaction with other members of the group, and social interaction among group members' [24, p. 22]. Some studies have treated group cohesion as a dimension of social integration within a group … while others have used the concepts of social integration and cohesion interchangeably [28]. This study does not go that far." (p. 78)	A 5-item Social Integration Scale (7-point) adapted from Smith, et al (1994). Unidimensionality confirmed with PCA, although the original 11-item scale demonstrated a two-factor solution and the reverse-coded items were excluded from further analysis. Discriminant validity supported by a PCA with 5-factor constraint, including *social integration*, *private collective self-esteem, importance to identity*, *past experience with groups*, and *membership esteem*.
Group social integration: The role of demographic diversity and perceived dissimilarity	NA	Chou, S. Y. (2011)	Group social integration refers to the degree to which an individual is psychologically linked to other group members in a work group (O'Reilly, Caldwell, & Barnett, 1989)." (p. 2) "Group social integration is an important concept because it reflects the group members' perception of inclusion-exclusion in terms of group member interaction and involvement within a work group (Mor Barak & Cherin, 1998)" (p. 3)	"When measuring social integration, this study followed O'Reilly, Caldwell, and Barnett's (1989) procedures." Group cohesion dimension demonstrated discriminant validity (PCA, oblique rotation). *Group cohesiveness* not highly correlated with *satisfaction with coworkers* (r = .27) and *number of social events participated* (r = .35). The measures used were indeed identical to this study. A group *social integration* score appears to have been obtained by aggregating individual scores, although a consensus exercise is not evident.

Title	Citations*	Author/s	Conceptualisation	Operationalisation
Surface- and deep-level dissimilarity effects on social integration and individual effectiveness related outcomes in work groups: A meta-analytic integration.	99	Guillaume, Y. R. F., Brodbeck, F. C., & Riketta, M. (2012)	"The most commonly studied work-related outcome at the individual level in diversity research is social integration (Tsui & Gutek, 1999). Social integration is conceptualised as "a function of attachment with a given group, satisfaction with peers and job, and the quality of social relations" (p. 84)	"Indicators of social integration (attachment, satisfaction, quality of social relations)" (p. 88) were coded.
Factors affecting knowledge integration – based on similarity-attraction theory.	5	Lin, T. C., Liu, C. C., & Tsai, Y. L. (2012)	"Social Integration refers to the attraction to the group, satisfaction with other members of the group, and social interaction among group members (O'Reilly, et al., 1989; Shaw, 1981; Smith, et al., 1994). It is a multifaceted compatibility phenomenon that links an individual psychologically to others in a group and determines how team members stick together" (p. 3)	"Nine items adapted from Shaw (1981) and supplemented by Smith, et al. (1994)" (p. 8) Items measured at the team level, averaged into a composite index of *social integration* following a team consensus analysis.
Positive is usually good, negative is not always bad: The effects of group affect on social integration and task performance.	30	Knight, A. P. & Eisenkraft, N. (2014)	"Several variables that fit within the construct space of social integration were represented in the group affect literature: cohesion, relationship conflict, commitment, cooperation, prosocial behavior, identification, and trust" (Knight & Eisenkraft, 2015, p. 1217)	"Coded variables that examined relational characteristics of groups as social integration" (Knight & Eisenkraft, 2015, p. 1217)

Notes. * Google citations on 1 January 2018

Appendix B

Ethics Approval Request for the Study entitled:

Piloting a Barometer of Social Integration in South African Organisations

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	Margaret Young Signature removed	16 Nov 2016

This application is approved by:

Supervisor	Ines Meyer Signature removed	16 Nov 2016
Co- Supervisor		

Approved. 30.11.2016
Prof U Rivett
Chair Signature removed
Ethics in Research Committee
Faculty of Commerce
University of Cape Town

Com Ethics_V4

Appendix C

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

Organisational Psychology Masters Programme Research Project

Dear Participant

As part of the UCT Organisational Psychology Masters Programme, I am conducting research examining the nature and measurement of social integration in workgroups. If you work in an organisation in South Africa (irrespective of your citizenship status), you are invited to complete the following survey which should take you appoximately 10 minutes.

Please note
Participation is voluntary and you are free to withdraw from the study at any point.
Your responses will be fully anonymous (i.e. you will not be asked to reveal your identity).
Any data you provide will be used for the purposes of this research only.
This research has been approved by the UCT Commerce Faculty Ethics in Research Committee.

By completing this survey, you confirm that you have understood the above and consent to participation in this study.

Thank you for your interest. Please do not hesitate to contact me should you have any further questions (yngmar010@myuct.ac.za).

Thank you,
Margaret Young

>>

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

Are you currently living and working in South Africa?

- Yes
- No

>>

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

The questions that follow relate to your experiences **within a workgroup**, within an organisation.

Do you currently work for an organisation (of any size)?

- Yes
- No

>>

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

Please indicate the extent to which you **agree** or **disagree** with the following statements.

In each statement, '**my workgroup**' or '**this workgroup**' refers to a formal work team within your organisation. If your workplace is not structured in this way, please think of your colleagues. The most important thing is to consistently think of the same group of people when answering these questions.

You may notice some similarities and repetition in the statements. This is intentional, so please do your best to rate each statement as accurately as possible. Thank you!

(page 1 of 6)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
When someone criticises my workgroup, it feels like a personal insult	○	○	○	○	○
I am very interested in what others think about my workgroup	○	○	○	○	○
When I talk about my workgroup, I usually say 'we' rather than 'they'	○	○	○	○	○
My workgroup's successes are my successes	○	○	○	○	○
When someone praises my workgroup, it feels like a personal compliment	○	○	○	○	○
If a story in the media criticised my workgroup, I would feel embarrassed	○	○	○	○	○
My employment in this workgroup is a big part of who I am	○	○	○	○	○
What this workgroup stands for is important to me	○	○	○	○	○
I share the goals and values of this workgroup	○	○	○	○	○
My membership of this workgroup is important to me	○	○	○	○	○
I feel strong ties with my workgroup	○	○	○	○	○

>>

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

Please indicate the extent to which you **agree** or **disagree** with the following statements.

In each statement, '**my workgroup**' or '**this workgroup**' refers to a formal work team within your organisation. If your workplace is not structured in this way, please think of your colleagues. The most important thing is to consistently think of the same group of people when answering these questions.

You may notice some similarities and repetition in the statements. This is intentional, so please do your best to rate each statement as accurately as possible. Thank you!

(page 2 of 6)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I would be very happy to spend the rest of my career with this workgroup	○	○	○	○	○
I enjoy discussing my workgroup with people outside it	○	○	○	○	○
I really feel as if this workgroup's problems are my own	○	○	○	○	○
I feel like 'part of the family' in this workgroup	○	○	○	○	○
I feel 'emotionally attached' to this workgroup	○	○	○	○	○
This workgroup has a great deal of personal meaning for me	○	○	○	○	○
I feel a strong sense of belonging to my workgroup	○	○	○	○	○
I feel a sense of belonging to my workgroup	○	○	○	○	○
I feel that I am a member of my workgroup	○	○	○	○	○
I see myself as part of my workgroup	○	○	○	○	○
I am enthusiastic about my workgroup	○	○	○	○	○
I am happy to work in this workgroup	○	○	○	○	○
My workgroup is part of one of the best organisations in the country	○	○	○	○	○

>>

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Please indicate the extent to which you **agree** or **disagree** with the following statements.

In each statement, '**my workgroup**' or '**this workgroup**' refers to a formal work team within your organisation. If your workplace is not structured in this way, please think of your colleagues. The most important thing is to consistently think of the same group of people when answering these questions.

You may notice some similarities and repetition in the statements. This is intentional, so please do your best to rate each statement as accurately as possible. Thank you!

(page 3 of 6)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am satisfied with my workgroup	○	○	○	○	○
I am satisfied with the way my workgroup functions	○	○	○	○	○
I am satisfied with the communication between workgroup members	○	○	○	○	○
I am satisfied with the leadership in my workgroup	○	○	○	○	○
I am satisfied with the relationship climate within my workgroup	○	○	○	○	○
My colleagues help me to do a good job	○	○	○	○	○
My colleagues always pass on important information to me	○	○	○	○	○
My colleagues do their best to collaborate with me in a proper way	○	○	○	○	○
The members of my workgroup are quick to defend each other from criticism from outsiders	○	○	○	○	○
The successes of other members of my workgroup help me achieve my own objectives	○	○	○	○	○
The members of my workgroup get along together very well	○	○	○	○	○
Everyone's input is incorporated into most important workgroup decisions	○	○	○	○	○
The members of my workgroup are always ready to cooperate and help each other	○	○	○	○	○
The members of my workgroup really stick together	○	○	○	○	○
Members in my workgroup interact socially outside of work	○	○	○	○	○
Members in my workgroup have good personal relationships	○	○	○	○	○
Members in my workgroup love to share their personal resources with each other	○	○	○	○	○

>>

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Igniting Knowledge and Opportunity

Please indicate the extent to which you **agree** or **disagree** with the following statements.

In each statement, '**my workgroup**' or '**this workgroup**' refers to a formal work team within your organisation. If your workplace is not structured in this way, please think of your colleagues. The most important thing is to consistently think of the same group of people when answering these questions.

You may notice some similarities and repetition in the statements. This is intentional, so please do your best to rate each statement as accurately as possible. Thank you!

(page 4 of 6)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My workgroup gives me the feeling that I belong	○	○	○	○	○
My workgroup gives me the feeling that I am part of this group	○	○	○	○	○
My workgroup gives me that feeling that I fit in	○	○	○	○	○
My workgroup treats me as an insider	○	○	○	○	○
My workgroup likes me	○	○	○	○	○
My workgroup appreciates me	○	○	○	○	○
My workgroup is pleased with me	○	○	○	○	○
My workgroup cares about me	○	○	○	○	○
My workgroup allows me to be authentic	○	○	○	○	○
My workgroup allows me to be who I am	○	○	○	○	○
My workgroup allows me to express my authentic self	○	○	○	○	○
My workgroup allows me to present myself the way I am	○	○	○	○	○
My workgroup encourages me to be authentic	○	○	○	○	○
My workgroup encourages me to be who I am	○	○	○	○	○
My workgroup encourages me to express my authentic self	○	○	○	○	○
My workgroup encourages me to present myself the way I am	○	○	○	○	○

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Igniting Knowledge and Opportunity

Please indicate the extent to which you **agree** or **disagree** with the following statements.

In each statement, '**my workgroup**' or '**this workgroup**' refers to a formal work team within your organisation. If your workplace is not structured in this way, please think of your colleagues. The most important thing is to consistently think of the same group of people when answering these questions.

You may notice some similarities and repetition in the statements. This is intentional, so please do your best to rate each statement as accurately as possible. Thank you!

(page 5 of 6)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I can influence the way work is done in my workgroup	○	○	○	○	○
I have the authority to make decisions at work	○	○	○	○	○
I have the authority to work effectively	○	○	○	○	○
I can influence decisions taken in my workgroup	○	○	○	○	○
Important responsibilities are part of my job	○	○	○	○	○
I have the skills and abilities to do my job well	○	○	○	○	○
I have the competence to work effectively	○	○	○	○	○
I have the capabilities required to do my job well	○	○	○	○	○
I can handle the challenges I face at work	○	○	○	○	○
I can do my work efficiently	○	○	○	○	○
I am inspired by the goals of my workgroup	○	○	○	○	○
I am enthusiastic about working toward my workgroup's objectives	○	○	○	○	○
I am enthusiastic about the contribution my work makes to my workgroup	○	○	○	○	○
I am inspired by what we are trying to achieve as a workgroup	○	○	○	○	○
I am keen on our doing well as a workgroup	○	○	○	○	○

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You have reached the final screen of questions. Thank you!

You will now be asked to **categorise yourself demographically** in one way or another. The information will be used to give us a simplified sense of our sample (i.e. who participated) but we appreciate that this method is difficult if you do not feel you fit neatly into any of these 'boxes'. Some questions have an option to opt out, for this or any other reason.

What is **your age**?

Please indicate your **first language**

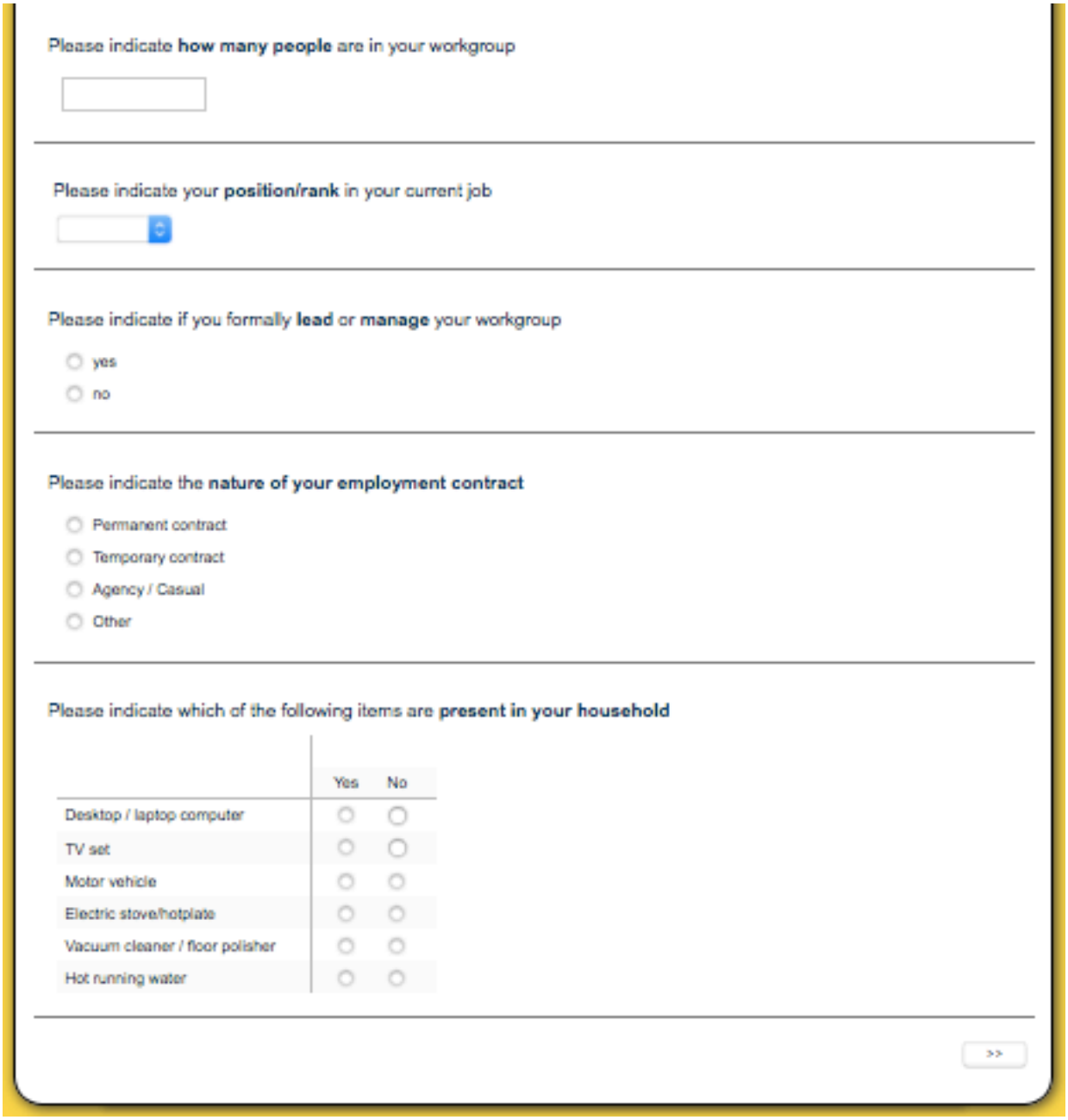
Please indicate your **gender**

Please indicate your **race**

Please indicate your highest level of **education**

Please indicate **how many people** are in your workgroup

Please indicate your **position/rank** in your current job



Please indicate **how many people** are in your workgroup

Please indicate your **position/rank** in your current job

Please indicate if you formally **lead** or **manage** your workgroup

- yes
- no

Please indicate the **nature of your employment contract**

- Permanent contract
- Temporary contract
- Agency / Casual
- Other

Please indicate which of the following items are **present in your household**

	Yes	No
Desktop / laptop computer		
TV set		
Motor vehicle		
Electric stove/hotplate		
Vacuum cleaner / floor polisher		
Hot running water		

>>

Appendix D

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

MAEL & ASHFORTH (1992) SCALE

1. When someone criticizes this organisation, it feels like a personal insult.
2. I am very interested in what others think about this organisation.
3. When I talk about this organisation, I usually say "we" rather than "they".
4. This organisation's successes are my successes.
5. When someone praises this organisation, it feels like a personal compliment.
6. If a story in the media criticized this organisation, I would feel embarrassed.

MAEL & ASHFORTH (1992) SCALE
(Adapted for the present research)

1. When someone criticizes my workgroup, it feels like a personal insult.
2. I am very interested in what others think about my workgroup.
3. When I talk about my workgroup, I usually say "we" rather than "they".
4. My workgroup's successes are my successes.
5. When someone praises my workgroup, it feels like a personal compliment.
6. If a story in the media criticized my workgroup, I would feel embarrassed.

EDWARDS & PECCEI'S (2007) ORGANISATIONAL IDENTIFICATION

1. My employment in this organisation is a big part of who I am.
2. I consider myself a [organisation] person.
3. What this organisation stands for is important to me.
4. I share the goals and values of this organisation.
5. My membership of this organisation is important to me.
6. I feel strong ties with this organisation.

Self-categorisation and labeling: 1,2
Shared organisational goals and values: 3,4
Sense of attachment, belonging, and membership of the organisation: 5,6

EDWARDS & PECCEI'S (2007) ORGANISATIONAL IDENTIFICATION
(Adapted for the present research)

1. My employment in this workgroup is a big part of who I am.
3. What this workgroup stands for is important to me.
4. I share the goals and values of this workgroup.
5. My membership of this workgroup is important to me.
6. I feel strong ties with my workgroup.

Appendix E

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

MEYER & ALLEN (1990) ORGANISATIONAL COMMITMENT SCALE

Affective Commitment

1. I would be very happy to spend the rest of my career with this organisation.
2. I enjoy discussing my organisation with people outside it.
3. I really feel as if this organisation's problems are my own.
4. I think that I could easily become as attached to another organisation as I am to this one.*
5. I do not feel like 'part of the family' at my organisation.*
6. I do not feel 'emotionally attached' to this organisation. *
7. This organisation has a great deal of personal meaning for me.
8. I do not feel a strong sense of belonging to my organisation.*

Continuance Commitment

9. I am not afraid of what might happen if I quit my job without having another one lined up.*
10. It would be very hard for me to leave my organisation right now, even if I wanted to.
11. Too much in my life would be disrupted if I decided I wanted to leave my organization now.
12. It wouldn't be too costly for me to leave my organisation now.*
13. Right now, staying with my organization is a matter of necessity as much as desire.
14. I feel that I have too few options to consider leaving this organisation.
15. One of the few serious consequences of leaving this organisation would be the scarcity of available alternatives.
16. One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice – another organization may not match the overall benefits I have here.

Normative Commitment

17. I think that people these days move from company to company too often.
18. I do not believe that a person must always be loyal to his or her organisation.*
19. Jumping from organisation to organisation does not seem at all unethical to me.*
20. One of the major reasons I continue to work for this organisation is that I believe that loyalty is important and therefore feel a sense of moral obligation to remain.
21. If I got another offer for a better job elsewhere I would not feel it was right to leave my organisation.
22. I was taught to believe in the value of remaining loyal with one organisation for most of their careers.
23. Things were better in the days when people stayed with one organisation for most of their careers.
24. I do not think that wanting to be a 'company man' or 'company woman' is sensible anymore.*

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

MEYER & ALLEN (1990) ORGANISATIONAL COMMITMENT SCALE (With negatively coded items reworded)

Affective Commitment

1. I would be very happy to spend the rest of my career with this organisation.
2. I enjoy discussing my organisation with people outside it.
3. I really feel as if this organisation's problems are my own.
5. I feel like 'part of the family' at my organisation.
6. I feel 'emotionally attached' to this organisation.
7. This organisation has a great deal of personal meaning for me.
8. I feel a strong sense of belonging to my organisation.

MEYER & ALLEN (1990) ORGANISATIONAL COMMITMENT SCALE (With negatively coded items reworded; adapted for the present research)

Affective Commitment

1. I would be very happy to spend the rest of my career with this workgroup.
2. I enjoy discussing my workgroup with people outside it.
3. I really feel as if this workgroup's problems are my own.
5. I feel like 'part of the family' in this workgroup.
6. I feel 'emotionally attached' to this workgroup.
7. This workgroup has a great deal of personal meaning for me.
8. I feel a strong sense of belonging to my workgroup.

Appendix F

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

BOLLEN & HOYLE (1990) PERCEIVED COHESION SCALE

Sense of Belonging

1. I feel a sense of belonging to _____.
2. I feel that I am a member of the _____ community.
3. I see myself as part of the _____ community.

Feelings of Morale

1. I am enthusiastic about _____.
2. I am happy to be at [live in/work at] _____.
3. _____ is one of the best schools [cities/organisations] in the nation.

BOLLEN & HOYLE (1990) PERCEIVED COHESION SCALE
(Adapted for the present research)

Sense of Belonging

1. I feel a sense of belonging to my workgroup.
2. I feel that I am a member of my workgroup.
3. I see myself as part of my workgroup.

Feelings of Morale

1. I am enthusiastic about this workgroup.
2. I am happy to work in this workgroup.
3. My workgroup is part of one of the best organisations in the country.

Appendix G

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

AARON, MCDOWELL & HERDMAN (2014) TEAM SATISFACTION

1. I am satisfied with my team.
2. I am satisfied with the way my team functions.
3. I am satisfied with the communication between team members.
4. I am satisfied with the leadership in my team.
5. I am satisfied with the relationship climate within my team.

AARON, MCDOWELL & HERDMAN (2014) TEAM SATISFACTION (Adapted for the present research)

1. I am satisfied with my workgroup.
2. I am satisfied with the way my workgroup functions.
3. I am satisfied with the communication between workgroup members.
4. I am satisfied with the leadership in my workgroup.
5. I am satisfied with the relationship climate within my workgroup.

Appendix H

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

VAN DER VEGT (2002) SOCIAL INTEGRATION SCALE

Perceptions of collaborative behaviour

1. My colleagues help me to do a good job.
2. My colleagues always pass on important information to me.
3. My colleagues do their best to collaborate with me in a proper way.

SMITH, ET AL. (1994) SOCIAL INTEGRATION SCALE

1. The members of the TMG are quick to defend each other from criticism by outsiders.
2. The successes of other members of the TMG help me to achieve my own objectives.
3. Everyone's input is incorporated into most important company decisions.
4. The members of the TMG get along together very well.
5. Relationships between members of the TMG are best described as "win-lose"; if he/she wins, I lose.*
6. The members of the TMG are always ready to cooperate and help each other.
7. When final decisions are reached, it is common for at least one member of the TMG to be unhappy with the decision.*
8. There is a great deal of competition between members of the TMG.*
9. The members of the TMG really stick together.

SMITH, ET AL. (1994) SOCIAL INTEGRATION SCALE
(Adapted for the present research)

1. The members of my workgroup are quick to defend each other from criticism from outsiders.
2. The successes of other members of my workgroup help me achieve my own objectives.
3. The members of my workgroup get along together very well.
4. Everyone's input is incorporated into most important workgroup decisions.
6. The members of my workgroup are always ready to cooperate and help each other.
9. The members of my workgroup really stick together.

Appendix I

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

LIN & SHIH (2008) TOP MANAGEMENT TEAM SOCIAL INTEGRATION SCALE

Cohesion

1. When facing critiques from outside the company, the members in the top management team of the company will promptly defend each other.
2. Successful experiences by other members in the top management team help me to achieve my goal.
3. Members in the top management team of the company get along very well.
4. Members in the top management team of the company indeed hold together.

Satisfaction with Co-Workers

1. I like the current operation mode used by the top management team.
2. The top management team of the company performs well.
3. Members in the top management team of the company love to share their personal resources with each other.

Social Interaction

1. Members in the top management team of the company interact socially outside of work.
2. Members in the top management team of the company have good personal relationships.
3. Members in the top management team of the company love to share their personal resources with each other.

LIN & SHIH (2008) TOP MANAGEMENT TEAM SOCIAL INTEGRATION SCALE (Adapted for the present research)

Social Interaction

1. Members in my workgroup interact socially outside of work.
2. Members in my workgroup have good personal relationships.
3. Members in my workgroup love to share their personal resources with each other.

Appendix J

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

JANSEN, ET AL. (2014) PERCEIVED GROUP INCLUSION SCALE

Group Membership

1. This group gives me the feeling that I belong.
2. This group gives me the feeling that I am part of this group.
3. This group gives me the feeling that I fit in.
4. This group treats me as an insider.

Group Affection

5. This group likes me.
6. This group appreciates me.
7. This group is pleased with me.
8. This group cares about me.

Room for Authenticity

9. This group allows me to be authentic.
10. This group allows me to be who I am.
11. This group allows me to express my authentic self.
12. This group allows me to present myself the way I am.

Value in Authenticity

13. This group encourages me to be authentic.
14. This group encourages me to be who I am.
15. This group encourages me to express my authentic self.
16. This group encourages me to present myself the way I am.

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

JANSEN, ET AL. (2014) PERCEIVED GROUP INCLUSION SCALE (Adapted for the present research)

Work Group Membership

1. My workgroup gives me the feeling that I belong.
2. My workgroup gives me the feeling that I am part of this group.
3. My workgroup gives me the feeling that I fit in.
4. My workgroup treats me as an insider.

Work Group Affection

5. My workgroup likes me.
6. My workgroup appreciates me.
7. My workgroup is pleased with me.
8. My workgroup cares about me.

Room for Authenticity

9. My workgroup allows me to be authentic.
10. My workgroup allows me to be who I am.
11. My workgroup allows me to express my authentic self.
12. My workgroup allows me to present myself the way I am.

Value in Authenticity

13. My workgroup encourages me to be authentic.
14. My workgroup encourages me to be who I am.
15. My workgroup encourages me to express my authentic self.
16. My workgroup encourages me to present myself the way I am.

Appendix K

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

MENON (2001) PSYCHOLOGICAL EMPOWERMENT SCALE

Perceived Control

1. I can control the way work is done in my organisation.
2. Important responsibilities are part of my job.
3. I can handle the challenges I face at work.
4. I have the authority to work effectively.
5. I have the authority to make decisions at work.

Competence

6. I have the skills and abilities to do my job well.
7. I can do my work efficiently.
8. I have the capabilities required to do my work well.
9. I have the competence to work effectively.
10. I can influence decisions taken in my department.

Goal Internalisation

11. I am inspired by the goals of the organisation.
12. I am keen on our doing well as an organisation.
13. I am enthusiastic about the contribution my work makes to the organisation.
14. I am inspired by what we are trying to achieve as an organisation.
15. I am enthusiastic about working towards the organisation's objectives.

All responses recorded on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree).

MENON (2001) PSYCHOLOGICAL EMPOWERMENT SCALE
(Adapted for the present research)

Perceived Control

1. I can control the way work is done in my workgroup.
2. Important responsibilities are part of my job.
3. I can handle the challenges I face at work.
4. I have the authority to work effectively.
5. I have the authority to make decisions at work.

Competence

6. I have the skills and abilities to do my job well.
7. I can do my work efficiently.
8. I have the capabilities required to do my work well.
9. I have the competence to work effectively.
10. I can influence decisions taken in my department.

Goal Internalisation

11. I am inspired by the goals of my workgroup.
12. I am keen on our doing well as a workgroup.
13. I am enthusiastic about the contribution I make to my workgroup.
14. I am inspired by what my work group is trying to achieve.
15. I am enthusiastic about working toward my workgroup's objectives.

Appendix L

DEMOGRAPHIC VARIABLES

1. What is your age? ☐

2. Please indicate your **first language**:
   a) Sepedi
   b) Sesotho
   c) Setswana
   d) siSwati
   e) Tshivenda
   f) Xitsonga
   g) Afrikaans
   h) English
   i) isiNdebele
   j) isiXhosa
   k) isiZulu
   l) Other
   m) Prefer not to say

3. Please indicate your **gender**:
   a) Male
   b) Female
   c) Transgender
   d) Intersex
   e) Prefer not to say

4. Please indicate your **race**:
   a) African
   b) Coloured
   c) Indian
   d) Asian
   e) White
   f) Other
   g) Prefer not to say

5. Please indicate your highest level of **education**:
   a) Lower than Matric
   b) Matric Certificate
   c) Diploma
   d) Undergraduate
   e) Honours
   f) Masters
   g) PhD

6. Please indicate **how many people** are in your workgroup**:** ☐

7. Please indicate your **position/rank** in your current job:
    a) Entry
    b) Junior
    c) Mid
    d) Senior

8. Please indicate if you formally **lead** or **manage** your workgroup
    a) Yes
    b) No

9. Please indicate the **nature of your employment contract**:
    a) Permanent contract
    b) Temporary contract
    c) Agency/Casual

Please indicate which of the following items are **present in your household:**
    10) Desktop / laptop computer
    11) TV set
    12) Motor vehicle
    13) Electric stove / hotplate
    14) Vacuum cleaner / floor polisher
    15) Hot running water

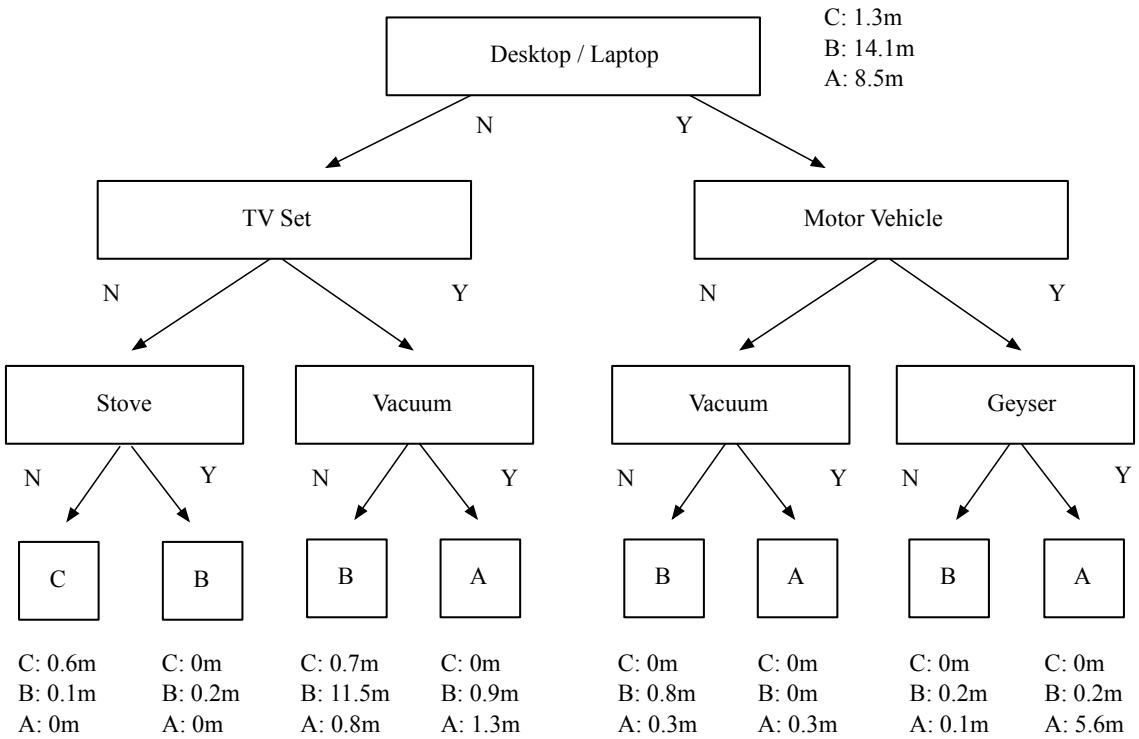
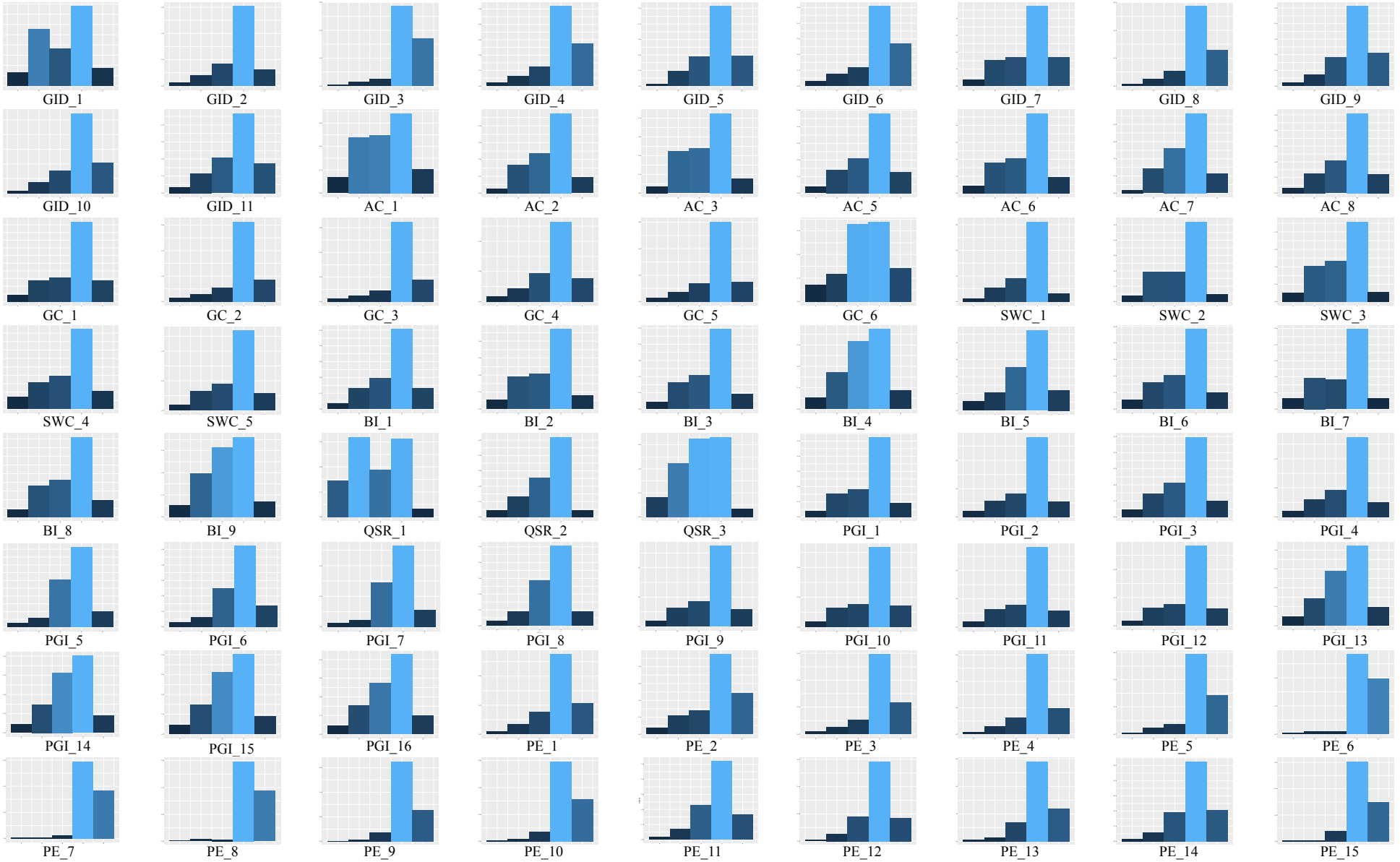


Figure 19. Living Standards Measure (Short Form) Decision Tree

Appendix M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AC_6
AC_7
AC_8
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GC_2
GC_3
GC_4
GC_5
GC_6
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SWC_3
SWC_4
SWC_5
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BI_2
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BI_4
BI_5
BI_6
BI_7
BI_8
BI_9
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QSR_2
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PGI_2
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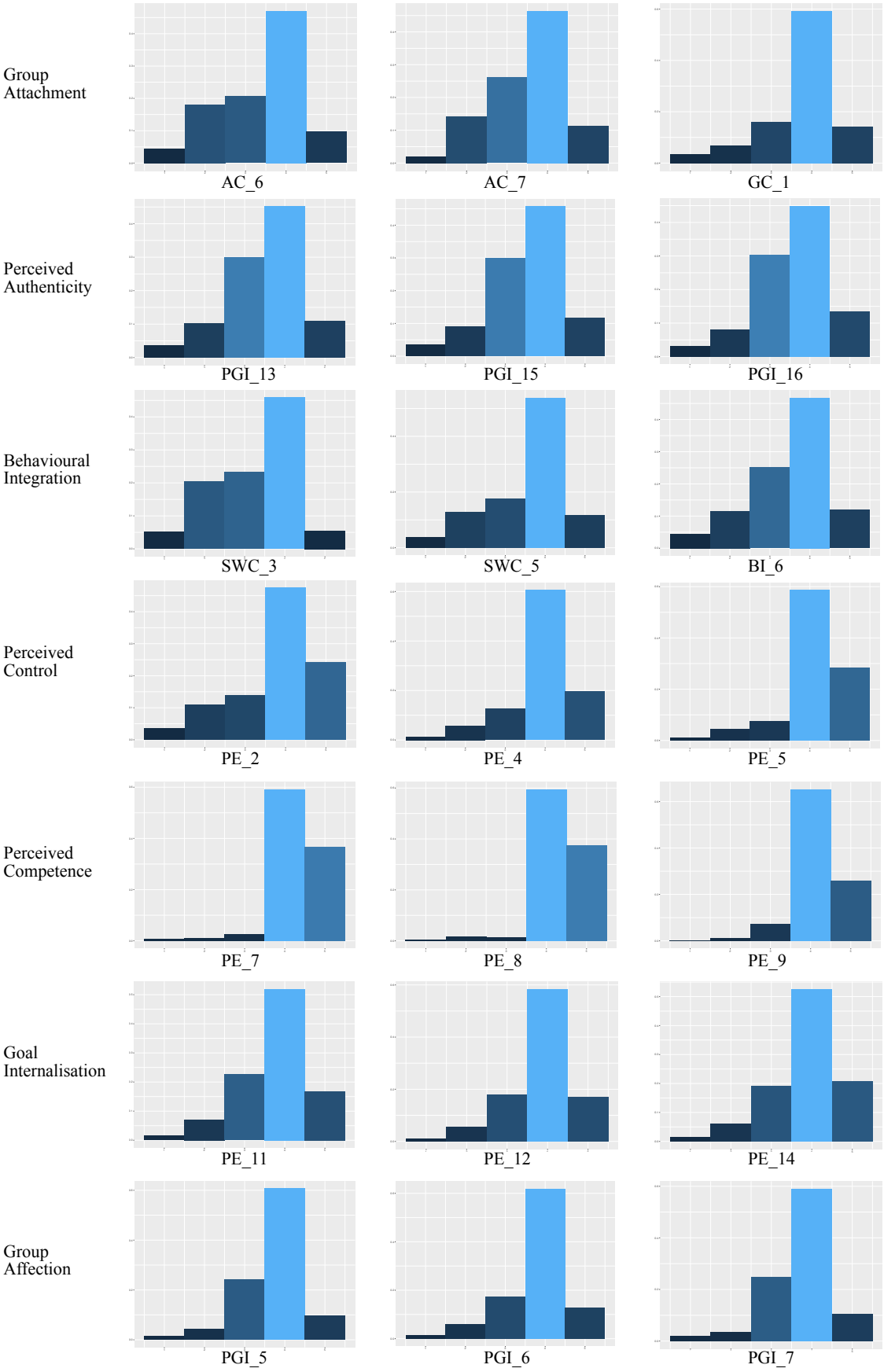
PE_15

Appendix N


Group Attachment
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AC_7
GC_1
Perceived Authenticity
PGI_13
PGI_15
PGI_16
Behavioural Integration
SWC_3
SWC_5
BI_6
Perceived Control
PE_2
PE_4
PE_5
Perceived Competence
PE_7
PE_8
PE_9
Goal Internalisation
PE_11
PE_12
PE_14
Group Affection
PGI_5
PGI_6
PGI_7

Appendix O

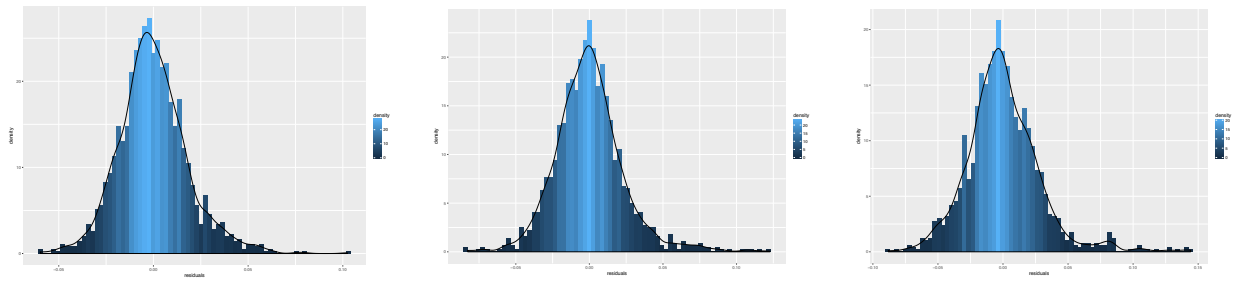

Figure 20. Histograms of Residual Values for Models 2a (Left), 2b (Middle) and 2c (Right)

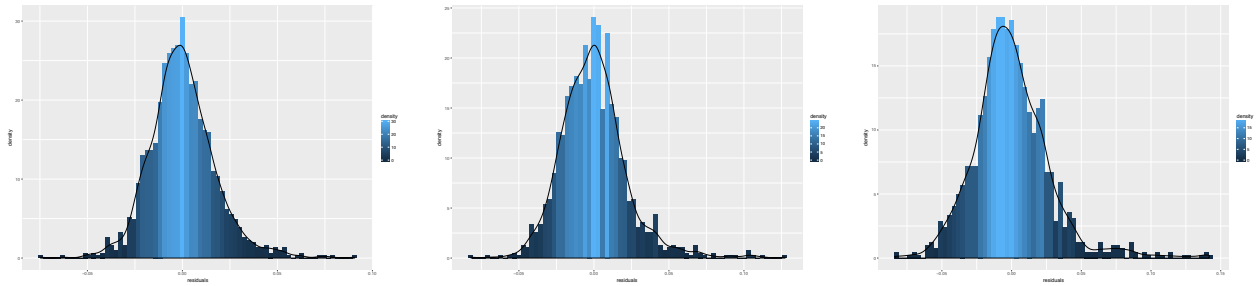

Figure 21. Histograms of Residual Values for Models 3a (Left), 3b (Middle) and 3c (Right)

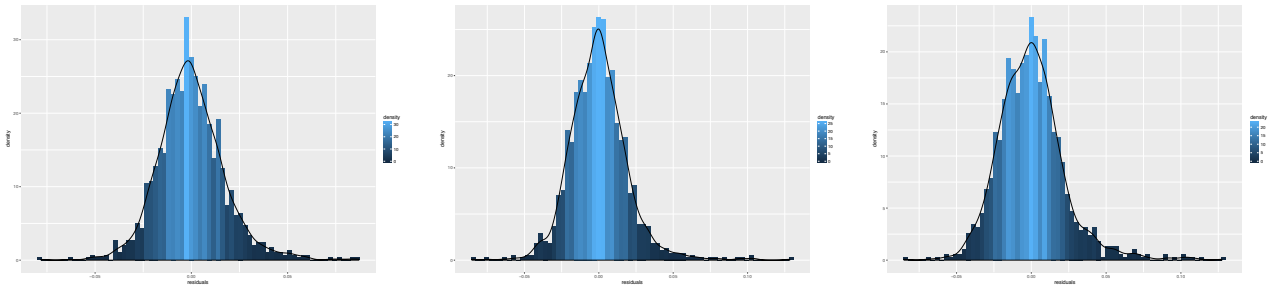

Figure 22. Histograms of Residual Values for Models 4a (Left), 4b (Middle) and 4c (Right)

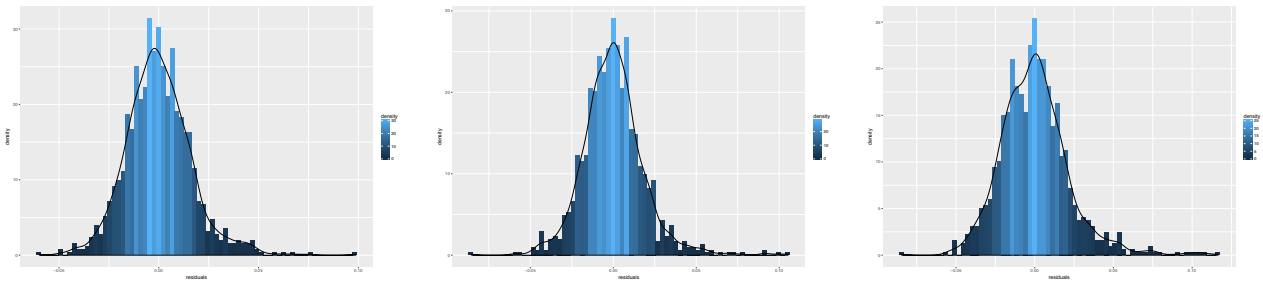

Figure 23. Histograms of Residual Values for Models 5a (Left), 5b (Middle) and 5c (Right)

Appendix P

Table 19

EFA Model B(1): Standardised Loadings Based Upon Correlation Matrix

	Factor 1: Social Integration	Factor 2: Perceived Competence	h^2	u^2	com
Factor 1: Belonging	**0.843**	0.022	0.733	0.267	1.000
Factor 2: Authenticity	**0.952**	-0.154	0.761	0.239	1.050
Factor 3: Behavioural Integration	**0.950**	-0.184	0.735	0.265	1.080
Factor 4: Perceived Control	**0.580**	0.368	0.717	0.283	1.690
Factor 5: Perceived Competence	-0.192	**0.893**	0.637	0.363	1.090
Factor 6: Goal Internalisation	**0.466**	**0.448**	0.658	0.342	2.000
Factor 7: Group Affection	**0.773**	0.104	0.702	0.298	1.040

Note. h^2 = communality values; u^2 = unique values; com = Hofmann's (1978) index of complexity. Pattern matrix coefficients > .4 are presented in bold

With the removal of the sixth factor ("Goal Internalisation") for cross-loading and a lack of discrimination between higher-order factors, the remaining factors loaded as follows:

Table 20

EFA Model B(2): Standardised Loadings Based Upon Correlation Matrix

	Factor 1: Social Integration	Factor 2: Perceived Competence	h^2	u^2	com
Factor 1: Belonging	**0.842**	0.005	0.713	0.287	1.000
Factor 2: Authenticity	**0.920**	-0.120	0.761	0.239	1.030
Factor 3: Behavioural Integration	**0.912**	-0.159	0.726	0.274	1.060
Factor 4: Perceived Control	**0.644**	0.303	0.683	0.317	1.420
Factor 5: Perceived Competence	-0.086	**0.892**	0.734	0.266	1.020
Factor 7: Group Affection	**0.793**	0.135	0.744	0.256	1.060

Note. h^2 = communality values; u^2 = unique values; com = Hofmann's (1978) index of complexity. Pattern matrix coefficients > .4 are presented in bold

This solution accounted for a cumulative 72.7% of the common variance. The second higher-order factor ("Perceived Competence") accounted for 21.4% of this variance, while "Social Integration" accounted for 78.6%.

Table 21

EFA Model C: Standardised Loadings Based Upon Correlation Matrix

	Factor 1: Social Integration	h^2	u^2	com
Factor 1: Belonging	**0.853**	0.727	0.273	1.000
Factor 2: Authenticity	**0.820**	0.673	0.327	1.000
Factor 3: Behavioural Integration	**0.795**	0.631	0.369	1.000
Factor 4: Perceived Control	**0.831**	0.690	0.310	1.000
Factor 5: Perceived Competence	0.395	0.156	0.844	1.000
Factor 6: Goal Internalisation	**0.766**	0.587	0.413	1.000
Factor 7: Group Affection	**0.844**	0.713	0.287	1.000

Note. h^2 = communality values; u^2 = unique values; com = Hofmann's (1978) index of complexity. Pattern matrix coefficients > .4 are presented in bold