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Generalizability of Achievement Goal Profiles across Five Cultural Groups: More Similarities than Differences

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Abstract

Previous results have shown possible cultural differences in students' achievement goals endorsement and in their relations with various predictors and outcomes. In this person-centered study, we sought to identify achievement goal profiles and to assess the extent to which these configurations and their associations with predictors and outcomes generalize across cultures. We used a new statistical approach to assess latent profile similarities across adolescents from five cultural backgrounds (*N* = 2,643, including Non-Indigenous Australians, Indigenous Australians, Indigenous American, Middle Easterners, and Asians). Our results supported the cross-cultural generalizability of the profiles, their predictors, and their outcomes. Five similar profiles were identified in each cultural group, but their relative frequency differed across cultures. The results revealed advantages of exploring multidimensional goal profiles.

Keywords: achievement goal profiles, cross-cultural comparison, latent profile analyses, Personal Investment Theory

Highlights

- A cross-cultural comparison of adolescents' achievement goal profiles was realized.
- We conducted latent profile analyses across students from five cultural backgrounds.
- The cross-cultural similarity of the profiles, antecedents, and outcomes was supported.
- Profiles leading to more positive outcomes and their antecedents were identified.
- The relative frequency of the profiles differed across cultures.

1. Introduction

There are few questions in education as important as understanding what motivates students to achieve and persist in their studies (Covington, 2000). Achievement goals are directly relevant to this critical question in referring to the purposes or reasons underlying achievement-related behaviors among students (Maehr & Zusho, 2009; Pintrich, 2003). Although the exact nature of these goals differs across students, achievement goals represent key predictors of desirable academic outcomes (Covington, 2000). Research on achievement goals is abundant, but a number of questions remain.

Studies on achievement goals have been mainly conducted in Western cultures, and those assessing cultural differences using appropriate methodologies remain scarce (Murayama, Zhou, & Nesbit, 2009; Zusho & Clayton, 2011) and often focus on a limited range of achievement goals (King & Watkins, 2012). These observations have led to calls for a more systematic investigation of the cross-cultural generalizability of achievement goals (Elliot, Murayama, & Pekrun, 2011; King & McInerney, 2014; Murayama, Elliot, & Friedman, 2012). Because culture represents a shared system of beliefs regarding what is important, valued, and acceptable for members of specific cultural groups, the range of achievement goals considered should be expansive rather than restricted, validated within and between groups, and subjected to various analyses to demonstrate their influence on the emergence of specific combinations (or profiles) of achievement goals.

Interested in the cross-cultural generalizability of achievement goals, McInerney and his colleagues (e.g., McInerney, 2003, 2007, 2008; McInerney, Yeung, & McInerney, 2001) used a large range of achievement goals (task, effort, competition, social power, affiliation, social-concern, praise and token reward) derived from personal investment theory (PIT) and found more similarities than differences in terms of both the measurement properties and the predictive utility of these goals across cultural groups. Although these previous variable-centered studies are very informative, their contribution is limited by the fact that only average levels of achievement goals were compared across cultural groups. However, achievement goals are not isolated constructs. Rather, achievement goals combine according to specific configurations within students, so that a more nuanced and holistic interpretation is required to achieve a proper depiction of their underlying multidimensionality (Dowson & McInerney, 2003). Given that each student may choose to pursue a variety of achievement goals simultaneously, some have advocated the importance of adopting a person-centered approach allowing for the identification of profiles of students presenting a distinct configuration of achievement goals (Linnenbrink-Garcia et al., 2012, Wormington & Linnenbrink-Garcia, 2016).

Results from previous variable-centered research have supported the cross-cultural reliability and validity of achievement goals measures. These results also generally showed that achievement goals tend to predict a similar range of outcomes in different cultures. However, what remains unknown is the extent to which prototypical patterns of person-specific goal configurations (i.e., profiles) generalize across cultures, as well as the extent to which these profiles are similarly associated with predictors and outcomes. There is a clear need for research to explore whether and how youth from various cultural backgrounds combine these multiple goals in culturally specific ways. Based on a wide range of achievement goals and on a new method for multi-group comparisons of profile solutions (Morin, 2016; Morin, Meyer, Creusier, & Biétry, 2016), we extend previous research by comparing achievement goals combinations across five distinct cultural groups.

1.1 Personal Investment Theory

From its inception, PIT was formulated to provide a cross-culturally relevant model of achievement motivation (Maehr, 1984; Maehr & McInerney, 2004; McInerney, 2008; McInerney & Ali, 2006; Zusho & Clayton, 2011). PIT focuses on how persons choose to invest their energy, talent, and time in specific tasks and is particularly helpful in studying motivation in cross-cultural settings. PIT is anchored in the recognition that culture has an influence on motivational processes, but without assuming that all people from a given culture will necessarily invest their efforts in a similar set of activities or that they will tend to pursue similar activities for similar reasons (Ganotice, Bernardo, & King, 2012; King & McInerney, 2014; Maehr & McInerney, 2004). PIT predated achievement goal theory and has included a focus on social and extrinsic goals from its beginning, in addition to mastery and performance goals (Maehr, 1984; Maehr & McInerney, 2004). Each of these four types of goals is presumed to be universal and to incorporate two facets, for a total of eight goals forming a truly multidimensional approach (McInerney & Ali, 2006; McInerney, 2012): (a) Mastery goals include task involvement (i.e., being interested in schoolwork and in improving one's competence) and effort (i.e., readiness to try hard and persist to improve one's competence through schoolwork); (b) performance goals include competition (i.e., desire to do better than others at schoolwork) and social power (i.e., a desire to perform socially, to achieve social power and leadership, through schoolwork); (c) Social goals include affiliation (i.e., seeking opportunities to collaborate with other students at schoolwork) and social concern (i.e., being concerned for other students, seeking to help other students in the context of schoolwork); (d) extrinsic goals include praise (i.e., seeking social recognition, praise, and approval for one's schoolwork) and token reward (i.e., seeking tangible rewards for schoolwork, such as certificates and prizes). The validity of these pairings has been demonstrated through higher-order confirmatory factor analysis (e.g., McInerney & Ali, 2006). According to PIT, each goal facet is seen as important to the understanding of students' motivation to achieve in school, with relations that are expected to vary according to the sociocultural context.

In addition to this comprehensive multidimensional theorizing of achievement goals, PIT has led to the development of a companion measure covering these eight goals, the Inventory of School Motivation (ISM; McInerney & Ali, 2006). The cross-cultural validity of the multidimensional structure of the ISM has been systematically assessed and supported in various studies (Ganotice et al., 2012; King & Watkins, 2013; McInerney, 2012; McInerney & Ali, 2006; McInerney et al., 2001). Both the assessment of a wider range of achievement goals and the thorough cross-cultural validation of the ISM made this instrument particularly well-suited to the current study when compared to alternative measures such as the Achievement Goal Questionnaire - Revised (AGQ-R; Elliot & Murayama, 2008) or the Patterns of Adaptive Learning Scales (PALS; Midgley et al., 2000).[1]

Although the mastery-performance distinction is mainly anchored in the internally-driven desire to respectively develop or demonstrate competence, goals with a more external focus may also be involved in the prediction of achievement-related behaviors (Brophy, 2005; Urdan & Maehr, 1995). Thus, as social and extrinsic goals are arguably crucial in understanding children and adolescents'

[1] It should be noted that an approach valence was used in the formulation of the ISM. In subsequent developments of achievement goal theory focusing solely on mastery and performance goals (e.g., Elliot & McGregor, 2001; Midgley et al., 2000) leading to the AGQ-R and PALS, an avoidance valence was added to performance and mastery goals (AGQ-R only). Although the ISM does not include an avoidance dimension, we believed it was the most suitable scale available for this study, which focuses on cross-cultural comparisons of achievement goal profiles. Still, we acknowledge that each of these goals may have an avoidance counterpart, which will need to be examined more thoroughly in future research.

motivation, many researchers have underscored the need for future research to more attentively consider these goals which have generally been neglected in previous research not based on PIT (Ali, McInerney, Craven, Yeung, & King, 2014; Brophy, 2005; King & Watkins, 2012). Although a focus on the development of competencies is central to educational success, we argue that critical social and extrinsic drivers of achievement-related behaviors also need to be considered to provide a more complete and holistic perspective of goal-directed behaviors, particularly in cross-cultural contexts.

1.2 Facilitating conditions as Predictors of Achievement Goals

For Maehr and Zusho (2009), a key challenge for achievement goals researchers is to achieve a better understanding of the emergence of these goals as a function of particular life contexts, such as culture. The original formulation of PIT is explicitly cross-cultural and presents a model of motivated action positing that the development and salience of the eight achievement goals should be aligned with individuals' sociocultural contexts. These influences have been referred to as "facilitating conditions" (Maehr & McInerney, 2004; McInerney, Dowson, & Yeung, 2005). These facilitating conditions, which include factors such as the perceived quality of social interactions with teachers, parents, and peers, school valuing and interest, and affect toward school, are assumed to play a role in shaping achievement goals, and particularly goal configurations emerging in various cultures (Ganotice, Bernardo, & King, 2013; McInerney et al., 2005; McInerney, Dowson, & Yeung, 2008).

Also according to PIT, students' levels of investment in an activity depends on the meaning they ascribe to this activity. School valuing is thus seen as a relevant predictor of achievement goals and as critical for the understanding of cross-cultural differences in academic achievement (Maehr, 1984). Previous studies further showed that utility value tended to predict the adoption of mastery and performance approach goals in mathematics (Chouinard, Karsenti, & Roy, 2007) and of mastery goals in English (Liem, Lau, & Nie, 2008). In addition, because they play a key role in the terms of ascribing value, promoting, or rewarding participation in certain types of activities, social interactions are also perceived as key facilitators of achievement goals adoption. In this regard, Wentzel (1997, 2003) found that perceived teacher support positively predicted the pursuit of two types of social goals, prosocial and social responsibility goals (Wentzel, 1997), whereas peer rejection negatively predicted the adoption of prosocial goals (Wentzel, 2003). Prosocial goals are similar to social concern goals assessed via the ISM and refer to sharing with peers and helping them with academic problems, whereas social responsibility goals refer to keeping commitment to peers and following the classroom rules – an aspect not directly covered in the ISM (Wentzel, 2003). A key issue that has yet to be more systematically investigated is the extent to which the effects of these facilitating conditions generalize to multiple cultural contexts (King & McInerney, 2014; McInerney et al., 2005) and how these relations will translate to a person-centered representation of a multidimensional achievement goals perspective.

1.3 Achievement Goals Outcomes

Achievement goals are well-documented predictors of a wide variety of educational outcomes (Covington, 2000). In the PIT tradition (Maehr & McInerney, 2004), learning processes like deep and surface learning strategies have commonly been studied as potentially important outcomes of achievement goals. Deep and surface learning strategies describe the inclination of students when engaging in their tasks (Biggs, 1987). When students are trying to uncover the true meaning of the material and to relate this new knowledge to previously relevant learning, they are described as relying on deep learning strategies. In contrast, surface learning strategies refer to the adoption of rote learning limited to bare essentials with the limited short-term goal of fulfilling the demands of the specific learning situation (McInerney, Cheng, Mok, & Lam; 2012). Results from variable-centered research have generally indicated positive relations between: (a) mastery and social goals and the adoption of deep learning strategies (Elliot & McGregor, 2001; King, McInerney, & Watkins, 2010; 2013; Watkins & Hattie, 2012); (b) performance goals and the adoption of surface (Hulleman & Corwin, 2010) and deep (Watkins & Hattie, 2012) learning strategies. Using cluster analyses, Dela Rosa and Bernardo (2013) further found that Filipino students who endorsed both mastery and performance goals reported a greater use of deep learning strategies than students who endorsed either of these goals in isolation (for similar results, see Suárez Riveiro, Cabanach, & Arias, 2001). In contrast, in a recent meta-analytic review, Wormington and Linnenbrink-Garcia (2016) rather suggested that students with a profile characterized by with high mastery goals or low performance goals were more likely to use adaptive learning processes and engage in school tasks.

Other potentially crucial outcomes of academic achievement goals are students' future expectations across multiple life domains (i.e., education, employment, family, and society). Lee, McInerney, Liem, and Ortiga (2010) found that both mastery and performance goals enhanced life ambitions across multiple domains. Previous studies also showed that mastery goals predicted perceived academic success (McInerney, Hinkley, Dowson, & Van Etten, 1998) and hope for future academic success (Pekrun, Elliot, & Maier, 2006).

Finally, another common outcome in research based on PIT is academic achievement. For instance, among university students from Iran, Amrai, Motlagh, Zalani, and Parhon (2011) found that task, effort, competition, and social concern goals were positively associated with academic achievement. However, Ali et al. (2014) showed that American high school students' achievement levels were mainly predicted by performance rather than social goals. In regard to goal combinations excluding external and social goals, Wormington and Linnenbrink-Garcia (2016) noted that students with average or low levels on all goals tended to present lower levels of achievement, while students endorsing performance goals tended to present higher levels of achievement. Despite those interesting findings, little is known about how a wider range of achievement goals combines to predict learning processes, future expectations, and academic achievement, and whether those associations generalize across various cultural backgrounds. Unfortunately, we did not assess achievement in the study and rather focus on learning processes and future expectations.

1.4 Cultural Context and Achievement Goals

Systematic cross-cultural research on achievement goals is scarce. Most research conducted in Western samples focuses on constructs like mastery and performance goals, which have been validated in Western contexts. So far, cross-cultural researchers have typically examined similarities or differences across two cultural groups (King & McInerney 2014; Zusho & Clayton, 2011). For instance, middle-class American (mostly White) have been compared to Asian students (mostly Chinese), revealing modest cross-cultural differences (Zusho & Clayton, 2011). Researchers have paid less attention to the cultural relevance of using a broader set of goals, to the need to widen the scope of achievement goals, and to cultural differences in the consequences of goal adoption (Elliot et al., 2011; King & Watkins, 2012; Murayama et al., 2012; Murayama et al., 2009; Urdan, 2004).

True cross-cultural studies (i.e., including participants from many cultures) are more common in research based on PIT, as the ISM scale has been developed to cover a broader range of goals in an attempt to increase the cultural generalizability of the measure (McInerney & Ali, 2006). Regarding goal endorsement, research based on PIT has generally demonstrated that mastery and performance goals were lower among Western groups in comparison to various cultural groups (e.g., Asian, Lebanese, Indigenous Australian, Navajo, Papua New Guinea; Ali et al., 2014; Magson et al., 2014; McInerney, 2008; 2012) (see McInerney et al., 1998, for a counterexample among Indigenous Australians). In addition, social and extrinsic goals also tended to be more salient in collectivist cultures and among indigenous populations (Ali et al., 2014; King & McInerney, 2014; King, McInerney, & Watkins, 2012; Magson et al., 2014; McInerney, 2008; 2012). Other researchers interested in comparing goal endorsement among Black and White Africans (Watkins, McInerney, Akande, & Lee, 2003) or Navajo and Anglo Americans students (Ali et al., 2014) have reported more similarities than differences across groups (see also McInerney, 2012).

Researchers using the PIT framework have also looked at how specific goals relate to educational outcomes across cultures. In general, mastery goals predicted positive outcomes across groups, such as deep learning strategies, students' intentions to pursue further education, positive affect for schooling, school valuing, achievement level, positive self-concept, beliefs of personal academic success (King, Ganotice, & Watkins, 2012; McInerney, 2008; McInerney et al., 1998; Watkins, McInerney, Lee, Akande, & Regmi, 2002). Others studies showed that mastery goals predicted deep learning strategies among Indigenous Australians and Hong Kong students, although it was not the case among Indigenous Americans and Filipino students (King, Ganotice, & Watkins, 2014; McInerney & King, 2013). Cultural differences were also observed in the predictive associations between other types of goals and learning strategies (King et al., 2014; McInerney & King, 2013; Watkins, McInerney, Lee, Akande, et al., 2002) or other outcomes. For instance, performance goals positively predicted affect and attendance for Asian students, but negatively predicted English achievement among Anglo Australians (McInerney, 2008). These types of goal were also associated with more positive self-conceptions among Filipino students, but not among Hong Kong students.

Whereas some studies showed that social goals were similarly related (King, Ganotice, et al., 2012) or unrelated (McInerney et al., 1998) to outcomes across cultural groups, McInerney (2008) also found distinction as they positively predicted school valuing for Indigenous Australian and Lebanese students, but negatively predicted Math achievement for Asian students. In this same study, Indigenous Australians were the only ones to benefit from extrinsic goals, which predicted positive affect toward school and Math achievement.

Taken together, results from these variable-centered studies indicate that both the level of endorsement of specific achievement goals, as well as their relations with important educational outcomes, presented both similarities and differences across cultures. However, little research has been conducted to investigate how achievement goals predictors might themselves differ across cultures. Moreover, cross-cultural researchers have yet to adopt a more holistic person-centered approach where achievement goals are considered in combination to investigate whether and how cultural differences impact the nature, or at least the relative frequency, of these achievement goal profiles. As noted by Pintrich (2003, p. 677), "we do not have a good understanding of multiple goals dynamics across multiple contexts, and this will be a focus of future research on goals and goal orientations." To date, few researchers have adopted a person-centered approach to investigate achievement goals combinations (e.g., Gonçalves, Niemivirta, & Lemos, 2017). In a recent synthesis of studies based on a person-centered approach, Wormington and Linnenbrink-Garcia (2016) observed low variability in regard to the ethnic composition of the samples and suggested that researchers should devote increased attention to possible cultural differences.

1.5 Adopting a Multiple Goal Perspective: Person-Centered Approach

A key aspect of a multidimensional achievement goals perspective is the recognition that any individual has the possibility to endorse and pursue multiple goals simultaneously (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Pintrich, 2000; Senko, Hulleman, & Harackiewicz, 2011). The variable-centered approach has led to major findings in achievement goals research, but its contribution to the exploration of goal combinations is limited. On the one hand, it is almost impossible to interpret interactions involving more than three interacting variables, whereas no such limits exist for latent profiles which can be estimated and interpreted based on any number of indicators. On the other hand, variables-centered analyses are based on a synthesis of every individual from a specific sample, but ignore the possibility that participants could come from subpopulations in which the associations between the goals may differ (Morin, Morizot, Boudrias, & Madore, 2011).

According to Pintrich (2003), researchers need to move beyond "a simplistic mastery goals (good) versus performance goals (bad)" (p. 676) approach to focus on understanding how multiple goals operate in combination and how each specific goal may create a context for the other goals. For example, performance goals, when considered alone, may express a competitive desire to outperform peers, whereas combined with mastery goals, they may reflect a desire to perform as a way to demonstrate one's mastery of a discipline. Alternatively, when combined with social goals, performance goals may emerge when academic performance is valued within one's peer group and may reflect a desire to work collaboratively as a way to increase performance.

In line with Pintrich (2003), Linnenbrink-Garcia et al. (2012) more recently encouraged researchers to rely on a person-centered approach in order to achieve a more holistic understanding of achievement goals. Others similarly noted that the person-centered approach was particularly well-suited to investigate complex interactions between multiple achievement goals and to explore typical goal combinations that goes beyond the mastery-performance distinction (Pastor, Barren, Miller, & Davis, 2007; Wormington & Linnenbrink-Garcia, 2016). The person-centered approach allows the identification of relatively homogeneous subgroups of participants presenting qualitatively and quantitatively distinct prototypical configurations of achievement goals (Morin & Marsh, 2015). Students can thus be categorized based on their correspondence with these distinct goal profiles, which can present differential associations with relevant predictors and outcomes. The person-centered approach thus offers an efficient way to achieve a more systemic understanding of how the various goals combine within individuals and which combinations are the most effective (Wormington & Linnenbrink-Garcia, 2016), an assertion that has generally been supported in prior research (e.g., Korpershoek, Kuyper, & van der Werf, 2015; Shim & Finch, 2014).

1.5.1 Previous research investigating goal combinations. The well-established distinction between mastery and performance goals has guided previous research on the effects of simultaneously endorsing multiple achievement goals. Methodologically, a variety of statistical analyses have been used in previous studies of achievement goal combinations, ranging from the examination of interactions (Barron & Harackiewicz, 2001) or the comparison of groups formed through a midpoint-split approach (Bouffard, Boisvert, Vezeau, & Larouche, 1995; Pintrich, 2000), to the application of true person-centered analyses relying on either cluster analyses (Daniels et al., 2008; Meece & Holt, 1993) or latent profile analyses (LPA; Luo, Paris, Hogan, & Luo, 2011; Pastor et al., 2007; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2012). These results indicated that mastery-oriented students display more favorable academic outcomes (see also Wormington & Linnenbrink-Garcia, 2016, for similar results from a meta-analytic review of person-centered studies also including the approach-avoidance dimension), whereas those who reported a low level of mastery and performance goals showed the least adaptive motivation and learning patterns. Results are less consistent when students are driven by both mastery and performance goals, showing that their academic adjustment can be better, similar, or worse than that of students who only pursue mastery goals.

In spite of these promising results, there is a paucity of research on the combination of multiple goals within a framework that also includes social and extrinsic goals. In a first study, Wentzel (1993) assessed the frequency to which American students focused on social responsibility or academic goals (a composite score for mastery and performance). Using a midpoint-split approach, she found the highest levels of achievement among students presenting a combination of high social responsibility and high academic goals. Students with a combination of high social responsibility and low academic goals also reported higher levels of academic achievement than students presenting a low level on both types of goals. These lower goals students did not differ from those reporting high academic and low social responsibility goals. In a second study based on the broad categories of mastery, performance, and social goals assessed by the ISM, Watkins and Hattie (2012) also used a midpoint-split procedure to create eight predetermined profiles depending on Hong Kong adolescents' levels on each of the three goals. Higher achievement levels were observed among students who simultaneously adopted high mastery, high performance, and low social goals, as well as among those who simultaneously adopted high social and low mastery goals (regardless of performance goals). The groups presenting high mastery, low performance, and high social goals showed the second-lowest achievement scores. One third of the students were included in the group presenting a low level on the three goals, whereas one fifth of the students presented high levels on the three goals. However, a key limitation of these two studies is the use of a midpoint-split approach to create the groups, which may fail to detect potentially meaningful subpopulations, or force the extraction of subgroups which may not naturally exist in the population (Morin, Morizot, et al., 2011).

Shim and Finch (2014) conducted one of the few person-centered LPA studies on mastery, performance and social goals in a sample of American middle-school students. These authors operationalized social goals as the development or the demonstration of social competence (see also Ryan, Jamison, Shin, & Thompson, 2012). These types of social goals are related to the general social domain (rather than to the achievement domain per se) and thus differ from the more specific social concern and affiliation goals assessed in the ISM, which are more specifically related to the academic domain. Their results revealed six profiles, which corresponded to three distinct patterns: (a and b) high levels of mastery and social goals; (c and d) moderate level on all goals; (e and f) low levels on all goals. The key difference between pairs of profiles corresponding to the same pattern was related to the fact that one profile (b, d, and f) always presented slightly higher levels of social goals, or more diverse social goals, than the other (a, c, e). Furthermore, these results showed that the mastery-oriented profiles (a, b) tended to be associated with higher levels of school adjustment (e.g., engagement, help seeking, adaptive learning). Within the remaining profiles, the moderate profile characterized by higher levels of social goals (d) tended to present higher levels of school and social adjustment than the others. In contrast, the low profile characterized by higher levels of social goals (f) did not differ from the other low profile (e). The authors concluded that social goals may help students with modest academic goals to stay engaged.

A more recent LPA study based on the four broad types of goals covered in the ISM (i.e., mastery, performance, social, and extrinsic) was conducted among a sample of 9th graders from The Netherlands (Korpershoek et al., 2015). This study revealed six profiles, again corresponding to a more limited number of patterns. These profiles were respectively characterized by: (a) a high level of performance and extrinsic goals; (b) a high level of mastery and social goals, (c) a high level on each goal; (d, e, and f) a low level on each goal, but extremely low levels of performance and extrinsic goals for profiles (e) and (f). Levels of school commitment and academic self-efficacy were highest in a profile presenting the highest level of achievement-related goals, and lowest in profiles characterized by levels of achievement-related goals falling below the sample average. However, academic achievement levels did not significantly differ across profiles. These patterns were replicated across four educational tracks, although students in the lowest educational tracks were overrepresented in the profiles characterized by lower levels of achievement-related goals.

Overall, previous results make it clear that there is added-value to the consideration of the combined effects of multiple achievement goals in the prediction of educational outcomes. However, none of these studies has included the full array of achievement goals proposed to be relevant within PIT. In addition, conclusions regarding the nature of these combinations from the few prior LPA studies including social or extrinsic goals are unclear as they relied on distinct goals operationalized differently. Another important limitation of these two studies is that they relied on Western samples, making it impossible to assess whether the nature of these profiles and their associations with outcomes generalize across cultures. More broadly, the reliance on Western samples including very low levels of variability in participants' ethnicity is also a limitation of previous person-centered studies operationalized based on the mastery and performance distinction (Wormington & Linnenbrink-Garcia, 2016). Moreover, predictors were not assessed, making it impossible to know which variables can predict the adoption of specific goal profiles and whether those relations are similar across cultures. In addition to the availability of a culturally diversified sample, a proper methodological framework is also required to guide the investigation of cross-cultural differences in achievement goals profiles, their predictors, and their outcomes.

1.5.2 Multi-group comparisons of profile solutions. Morin (2016; Morin et al., 2016) recently proposed a comprehensive framework to systematically and quantitatively compare profile solutions across meaningful subgroups of participants. Following an initial assessment of whether the number (1. configural similarity), nature (2. structural similarity), homogeneity (3. dispersion similarity), and size (4. distribution similarity) of the profiles differ across groups, this sequence can be extended to test whether the associations between the profiles, their predictors (5. predictive similarity) and their outcomes (6. explanatory similarity) generalize across groups of participants. This framework is thus particularly well-suited to an investigation of whether achievement goals configurations, and their associations with predictors and outcomes, generalize across distinct cultural groups.

More precisely, the first four steps are conducted to explore the extent to which the latent profile solution can be considered to be similar across the subgroups. Initial tests of configural similarity aim to determine whether the same number of profiles can be identified across subgroups. Then, tests of structural similarity aim to determine whether the shape or nature of the extracted profiles can be considered to be similar across subgroups. Assuming structural similarity, the third step then verifies whether the level of within-profile variability (i.e., the degree to which members of each profile are similar to one another) can be considered to be similar across subgroups[2]. Then, tests of distribution similarity assess whether the relative sizes (or prevalence) of the profiles can be considered to be similar across subgroups. Starting from the most similar model retained so far, the next two steps aim to assess the degree of similarity in terms of associations between the profiles, their predictors, and their outcomes across subgroups. More precisely, it allows researchers to verify whether variables of interest have similar "predictive" effect on participants' likelihood of membership into the various profiles across groups (i.e., predictive similarity) and whether profiles share similar associations with outcomes (i.e., explanatory *predictive similarity*) across subgroups.

1.6 The Present Study

The purpose of this study was to investigate whether students from five distinct cultural groups (Non-Indigenous Australians, Indigenous Australians, Indigenous Americans, Middle Easterners, and Asians) shared similar goal configurations and whether the predictors and outcomes of these

[2] In LPA, the profiles are prototypical in nature. More precisely, individuals corresponding to a specific profile are not expected to share the exact same configuration of achievement goals, but are rather allowed to differ from one another around the average prototypical configuration that characterizes the profile. Testing for dispersion similarity thus involves investigating if this within-profile interindividual variability differs across cultural groups, i.e., if profile members are more similar to one another (or prototypical) in some groups.

configurations were similar across cultures. These five specific cultural groups were retained as their cultural characteristics suggest that they might potentially be characterized by different configurations of the relative salience of each of the eight motivational goals proposed as critical in PIT. Although previous variable-centered research has revealed more similarity than differences across cultural groups in terms of goal endorsement (Ali et al., 2014; McInerney, 2008, 2012; Watkins et al., 2003), interesting differences can also be expected. Thus, the Indigenous Australian (McInerney, 2008; McInerney & King, 2013; McInerney, Fasoli, Stephenson, & Herbert, 2012) and Indigenous American (Ali et al., 2014; McInerney & Swisher, 1995) groups have been shown to be closely aligned with collectivist values where the social values of affiliation and social concern goals, as well as extrinsic goals, are thought to predominate over individual values such as mastery and performance goals. Many Asian groups, while being associated with collectivist values, also have a strong Confucian heritage that is often proposed to influence their value system through filial piety and the respect of authority (King & McInerney, 2014; King et al., 2010, 2013). Middle-eastern groups are also similarly aligned with the collectivist values of affiliation and social concern, although extrinsic motivation and a degree of individualism is also thought to be highly salient (McInerney, 2008; Nasser & McInerney, 2016). Interestingly, performance goals seemed more prevalent in Asian and middle-Eastern cultures relative to Western cultures (Dekker & Fischer, 2008; Hulleman, Schrager, Bodman, & Harackiewicz, 2010; McInerney, 2008). The non-Indigenous Australian group, largely from an Anglo-background, is generally thought to be most closely aligned with individualistic values such as mastery and performance goals. While we did not explicitly build upon the individualistic/collectivistic typology in the current study, this typology provided a context for assuming differences in the patterns of goals characterizing the profiles of the five groups as well as the influence of the facilitating conditions.

Specifically, we first addressed the following research questions: Is it possible to identify a meaningful set of achievement goal profiles among youth from different cultural groups? If so, to which extent are these profiles similar or different across cultures? Following the identification of the final set of achievement goal profiles, we also addressed the following research questions: Can membership into these profiles be predicted by specific facilitating conditions? Does membership into these different profiles predict relevant educational outcomes? To which extent are relations between achievement goal profiles, predictors, and outcomes similar or different across cultures? To answer these questions, we first verified whether the same number of latent profiles would be extracted in each cultural group. Although we considered a greater number of goals, results from prior LPA studies led us to expect to find around six profiles in the current study (Korpershoek et al., 2015; Shim & Finch, 2014). Second, we investigated the degree to which these latent profile solutions would be replicated across these five cultural groups in terms of nature, variability, and relative size. Given that prior person-centered research has been very limited, particularly research adopting a multiple goal perspective aligned with PIT, we adopted an essentially exploratory approach centered on research questions rather than hypotheses regarding likely sources of cultural similarities or differences. Finally, we extended previous research by considering not only important educational outcomes of these achievement goal profiles, but also predictors of profile membership as well as the extent to which relations between profiles, predictors and outcomes generalize to the five cultural groups. In this regard, our approach was also exploratory, as testing the similarity of the relation between the achievement goal profiles and the covariates implies relatively similar profiles across cultural groups and relies on the results of the previous steps of the analyses.

2. Method

2.1 Participants and Procedures

A total of 2643 adolescents (attending grades 7 to 12) participated in the first measurement point (52% females; aged 11 to 18; M_{age} = 13.3) and completed the questionnaires related to achievement goals and their predictors. These participants were grouped into five distinct cultural groups: (a) Non-Indigenous Australians coming from an Anglophone cultural background (n = 883; 48% females; M_{age} = 13.0); (b) Indigenous Australians (n = 333; 55% females; M_{age} = 13.6) including mainly Aboriginal Australians (79%); (c) Indigenous Americans (n = 743; 53% females; M_{age} = 13.9), including mainly Navajos (96%); (d) Middle Easterners (n = 363; 54% females; M_{age} = 13.1), coming essentially from a Lebanese background (85%); (e) Asians (n = 321; 54% females; M_{age} = 13.3), coming mainly from a Vietnamese (35%), Chinese (21%), and Cambodian (19%) background. Two years later, 1452 participants, including 53% of females, completed a second questionnaire including the outcomes. This sample included 514 Non-Indigenous Australians, 122 Indigenous Australians, 409 Indigenous Americans, 212 Middle Easterners, and 195 Asians. This study was conducted in 2001-2004 and was funded by an Australian Research Council Discovery Grant.

The Australian schools forming this sample were chosen among urban and rural areas located in the state of New South Wales (NSW) to ensure a satisfactory sampling of a wide diversity of cultural groups, including Indigenous Australians. Indigenous American Indians (mainly Navajo) were also specifically recruited in US schools located in Arizona. Appropriate ethical approvals were obtained from the University of Western Sydney research ethics committee, the NSW Department of Education and Training, local Aboriginal Educational Consultative Groups, the United School Districts and School Boards, and the schools principals of the Indigenous Schools in Arizona. All students and their parents were provided with informed consent information, and their consent was obtained prior to participation. Details of the purpose of the study were stated at the beginning of each survey session. Survey sessions were conducted with intact class groups, or when the numbers were small, in full-school groups. No teachers were involved in the administration of the survey.

2.2 Measures

2.2.1 Achievement goals. The 43 items from the ISM (McInerney & Ali, 2006) were used to assess the eight dimensions of achievement goals proposed by PIT: (a) Task (4 items, α = .65; e.g., "I like to see that I am improving in my schoolwork"); (b) Effort (7 items, α = .79; e.g., "I work hard to try to understand new things at school"); (c) Competition (6 items, α = .79; e.g., "I like to compete with others at school"); (d) Social Power (6 items, α = .83; e.g., "It is very important for me to be a group leader"); (e) Affiliation (3 items, α = .68; e.g., "I try to work with friends as much as possible at school"); (f) Social Concerns (4 items, α = .70; e.g., "It is very important for students to help each other at school"); (g) Praise (5 items, α = .81; e.g., "Praise from my teachers for my good schoolwork is important to me"); (h) Token Reward (5 items, α = .83; e.g., "I work best in class when I can get some kind of reward"). Participants were asked to rate each item using a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

2.2.2 Predictors. Possible predictors of achievement goal profiles were assessed using the 36-item version of the Facilitating Conditions Questionnaire (FCQ; Ganotice et al., 2013; McInerney, 1991, 1992; McInerney et al., 2005). This instrument measures seven distinct dimensions: (a) School Valuing (9 items, α = .85; e.g., "School students should complete high school"); (b) Affect Toward School (3 items, α = .75; e.g., "I like studying"); (c) Parental Academic Support (6 items, α = .86; e.g., "My father helps me to work hard at school"); (d) Parental Negative Attitudes Toward School (4 items, α = .85; e.g., "My father thinks that I should leave school and get a job"); (e) Teacher Support (6 items, α = .81; e.g., "I get encouragement from some of my teachers to do well at school"); (f) Positive Peer Influence (4 items, α = .69; e.g., "Most students in my class will complete high school"); (g) Negative Peer Influence (4 items, α = .71; e.g., "Some of my friends tell me I should leave school when I can"). Participants were asked to rate each item using a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

2.2.3 Outcomes. Learning processes and future expectations were assessed as potential outcomes of the achievement goal profiles. First, deep (6 items, α = .65; e.g., "I try to relate what I have learned in one subject to what I already know in other subjects") and surface (6 items, α = .65; e.g., "I don't spend time on learning things that I know won't be asked on the exam") learning were assessed using the Learning Process Questionnaire (LPQ; Biggs, 1987; McInerney, Cheng, et al., 2012). Participants were asked to rate each of these items on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Five dimensions of students' future expectations (High School: α = .63; University: α = .75; Employment: α = .72; Family: α = .71; Society: α = .59) were also assessed. Each dimension was measured by two items: One item assessed students' confidence in doing well (e.g., "I am confident that I will get a reasonably good job in the future"), while the other item assessed their confidence in knowing how to do so (e.g., "I know what I need to do to finish high school). Participants also rated these items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). As the future expectations subscales include only two items, the Spearman-Brown formula was used to adjust estimates based on eight-equivalent items: (a) .87 for High School, (b) .92 for University, (c) .91 for Employment, (c) .91 for Family; (d) .85 for Society.

2.3 Analyses

2.3.1 Latent profile analyses. LPA (Lazarsfeld & Henry, 1968; Muthén, 2002) were conducted to explore potential achievement goal profiles in each of the five cultural groups. These analyses were based on factor scores reflecting participants' levels on each of the eight achievement goals measured in the ISM, using the robust Maximum Likelihood estimator available in Mplus 7.3 (Muthén, & Muthén, 2014). These factors scores (specified to have a mean of 0 and a standard deviation of 1 in the total sample considered here) were saved from measurement models reported in the initial sections of the online supplements, which fully supported the measurement invariance of the ISM across the five cultural groups (see Table S1 of the online supplements), as well as the factor validity of the ISM ratings (see Table S2 of the online supplements). Although results from previous research led us to expect six profiles, given the greater number of goals considered in the present study, solutions including up to 8 latent profiles were considered in each of the five cultural groups. The means and variances of the achievement goals were freely estimated in all profiles (Peugh & Fan, 2013; Morin, Maïano et al., 2011). Models were estimated using 5,000 random sets of start values, 100 iterations for each random start, and the 200 best solutions retained for final stage optimization (Hipp & Bauer, 2006; McLachlan & Peel, 2000). These values were respectively increased to 10,000, 1000, and 500 in the cross-cultural models used to test the similarity of the identified profiles across cultural groups. All solutions converged on a well-replicated loglikelihood value.

In order to determine the optimal number of profiles in the data, it is important to consider the substantive meaning and theoretical conformity of the profiles (Marsh et al., 2009; Muthén, 2003), the statistical adequacy of the solution (e.g., absence of negative variance estimates; Bauer & Curran, 2004), and the multiple statistical indicators available to help in this decision (McLachlan & Peel, 2000). Among these statistical indicators, we report the Akaike Information Criterion (AIC), the Bayesian information criterion (BIC), the Consistent AIC (CAIC), the sample-size adjusted BIC (ABIC), the Lo, Mendell, and Rubin (2001) likelihood ratio test (LMR), and the Bootstrap Likelihood Ratio Test (BLRT). Results from simulation studies indicate that the CAIC, BIC, ABIC, and BLRT are particularly effective in choosing the model which best recovers the sample's true parameters (e.g., Nylund, Asparouhov, & Muthén, 2007; Tofighi & Enders, 2008). A lower value on the AIC, CAIC, BIC and ABIC suggests a better-fitting model. Both the LMR and BLRT compare a *k*-profile model with a *k-1*-profile model. A significant *p* value indicates that the *k-1*-profile model should be rejected in favor of a *k*-profile model. However, since these tests are all variations of tests of statistical significance, the class enumeration procedure can still be heavily influenced by sample size (Marsh et al., 2009). That is, with sufficiently large samples, these indicators may keep improving with the addition of latent profiles to the model without reaching a minimal point. In these cases, information criteria should be graphically presented through "elbow plots" illustrating the gains associated with additional profiles (Morin, Maïano, et al., 2011; Petras & Masyn, 2010). In these plots, the point after which the slope flattens out indicates the optimal number of profiles in the data. Finally, the entropy indicates the precision with which the cases are classified into the profiles (varying from 0 to 1), but should not be used to determine the optimal number of profiles (Lubke & Muthén, 2007).

2.3.2 Cross-cultural models, predictors, and outcomes. Multiple group LPA (e.g., using the KNOWNCLASS function available in Mplus to identify membership into the five cultural groups) were conducted to systematically assess the similarity of the latent profile solution across the five cultural groups considered in the present study, following the sequence of tests proposed by Morin (2016; Morin et al., 2016) and described above: 1. configural, 2. structural, 3. dispersion, 4. distribution, 5. predictive, and 6. explanatory. In this sequence, models including equality constraints across subgroups are compared to previous less restricted models, using the same information criteria (AIC, CAIC, BIC, ABIC) described above (Lubke & Neale, 2006, 2008; Petras & Masyn, 2010). Lower values on at least two of those criteria are taken to suggest that the equality constraints imposed across samples are supported by the data (Morin & Wang, 2016). Annotated Mplus input codes for the cross-cultural models estimated here are reported in the online supplements.

Predictors are integrated through a multinomial logistic regression. In multinomial logistic regressions, each predictor has *k*-1 (with *k* being the number of profiles) complementary effects for each possible pairwise comparison of profiles. Following the incorporation of predictors into the model, we proceeded to tests of *predictive similarity* of the profiles by constraining these logistic regressions to equality across cultural groups. Finally, outcomes were also incorporated to the solution. The MODEL CONSTRAINT command of Mplus was used to test mean-level differences across all pairs of profiles (using the multivariate delta method: e.g., Raykov & Marcoulides, 2004; for an application, see Kam, Morin, Meyer, & Topolnytsky, 2016). Tests of explanatory similarity were conducted by constraining the within-profile outcome means to equality across cultural groups, in order to verify whether the outcomes level in specific profiles are similar across these groups.

To ensure that the nature of the profiles remained unaffected by the inclusion of covariates (Marsh et al., 2009; Morin, Maïano et al., 2011; Morin, Morizot, et al., 2011), models with covariates were estimated using the start values from the final retained model from the first four steps. This procedure was particularly important for models including the outcomes given that their ratings were only provided by the subsample who completed Time 2. In conjunction with the full information maximum likelihood procedure for handling missing data (Enders, 2010; Graham, 2012), this made it possible to maintain the estimation of the profiles using the full sample of participants who completed Time 1 measures, yet assessing the relations between these profiles and the outcomes using only the subsample of participants who completed Time 2 measures.

Predictors and outcomes included in these models were also generated as factor scores from measurement models reported in the initial section of the online supplements, which also fully supported the measurement invariance of the ratings across these five groups (see Table S1 of the online supplements), as well as their factor validity (see Table S2 of the online supplements). Correlations among all of variables are reported in Table 1, together with model-based estimates of composite reliability which all proved to be fully satisfactory. These estimates of composite reliability were calculated using the standardized parameters from the preliminary measurement models described in the online supplements, based on McDonald's (1970) omega (ω) coefficient: $\omega = (\Sigma|\lambda_i|)^2 / ([\Sigma|\lambda_i|]^2 + \Sigma\delta_i)$, where λ_i are the standardized factor loadings and δ_i, the standardized item uniquenesses. In comparison with more traditional scale score reliability estimates (e.g., alpha; see Sijtsma, 2009), ω is sensitive to the strength of associations between items and constructs (λi) as well as item-specific measurement errors (δi).

3. Results

3.1 Achievement Goal Profiles

The fit indices for solutions including 1 to 8 latent profiles estimated separately in each cultural group are reported in Table S3 of the online supplements. For most groups, the AIC, ABIC, and BLRT kept on improving with the addition of latent profiles to the data, thus providing only limited information to help in the selection of the optimal number of latent profiles. The other indicators only proved to be slightly more informative: The aLMR suggested solutions varying from 3 to 5 profiles across cultural groups, the CAIC converged on solutions varying from 5 to 7 profiles across cultural groups, and the BIC supported solutions varying from 5 to 8 profiles across cultural groups. To complement this information, we relied on graphical representation of the values of these information criteria (Morin, Maïano, et al., 2011; Petras & Masyn, 2010). These elbow plots are reported in the online supplements (see Figure S1a to S1e) and showed that decreases in most information criteria reached a plateau around five profiles for most cultural groups. Examination of the 5-profile solutions, and bordering 4- and 6-profile solutions, showed that all solutions were fully proper statistically. This examination also revealed that adding a fifth profile always resulted in the addition of a well-defined qualitatively distinct and theoretically meaningful profile, whereas adding a sixth profile often resulted in the arbitrary division of one of the existing profiles into two distinct profiles differing only quantitatively from one another. This 5-profile solution was thus retained for each cultural group, providing a reasonable level of classification accuracy with an entropy value ranging from .793 for the Non-Indigenous Australians to .895 for the Indigenous Australians. The final statistical indicators associated with this 5-profile solution in each cultural group are reported in the top section of Table 2.

3.2 Cross-Cultural Similarity (Structural, Dispersion, and Distributional) of the Profiles

The goodness-of fit for the cross-cultural similarity models are reported in Table 2. This sequence started with the estimation of multiple-group 5-profile model of configural similarity. From this model, we estimated a model of structural similarity. Although this model resulted in a slightly lower value on the CAIC, it resulted in higher values on the AIC, BIC, and ABIC, suggesting that the structure of the profiles may not be fully identical across the five cultural groups. A visual examination of the nature of the profiles identified within each cultural group showed that four profiles out of five were identical across the five cultural groups. In addition, the inspection of the fifth profile suggested three distinct profiles instead of five, as two pairs of profile solutions were very much alike (Indigenous: Indigenous Australians and Indigenous Americans; Eastern: Middle Easterners and Asians). Interestingly, these specific groupings (Indigenous, Eastern) are also well-aligned with the known cultural differences and similarities found across these groups and presented earlier in "1.6. The Present Study" section. Based on these observations, we estimated a model of partial structural similarity in which four profiles were constrained to equality and the fifth profile was allowed to differ across broader cultural groups (Non-Indigenous Australians, Indigenous, and Eastern). This model resulted in lower values on the CAIC and the BIC than the model of configural similarity, supporting the partial structural similarity of the model.

Second, we estimated a model of dispersion similarity, using the same partial equality pattern as in the previous model. More precisely, variances were constrained to equality only when the means were already constrained to equality. This model resulted in lower values on the AIC, BIC, CAIC, and ABIC than the previous model of partial structural similarity, thereby supporting the partial dispersion similarity of the profiles. These results showed that, whenever profile structure is equivalent across cultures, levels of within-group variability (or homogeneity of the profiles) are also equivalent.

Finally, we estimated a model of distributional similarity, in which the relative size of the profiles was constrained to be equivalent across the five cultural groups. This model resulted in increased values on all information criteria, suggesting that the relative size of the profiles differed across these five groups. We thus pursued a model of partial distributional similarity in which the relative size of all profiles was allowed to differ across the three broad cultural groups which were previously found to be characterized by a fifth distinct profile (Non-Indigenous Australians, Indigenous, Eastern), but constrained to be equal across each pair of groups forming these broader cultural groups (a. Indigenous Australians and Indigenous Americans; b. Middle Easterners and Asians). When compared to the model of dispersion similarity, this model of partial distributional similarity resulted in lower values on the BIC and CAIC and was thus supported by the data. This model of partial distribution similarity was thus retained for interpretation and for the next stages of the analyses.

These profiles are illustrated in Figure 1. For greater precision, the exact within-profile means and variance of the achievement goals in each of the five cultural groups are reported in the online supplements (Table S4). The relative size of each profile in each of the broad cultural groups is reported in Table 3. Profiles 1 to 4 were equivalent across cultural groups, while Profile 5 differed across the three broad cultural groups. Profile 1 was characterized by high scores on mastery goals (task involvement and effort) and low scores on performance goals (competition and social power). This profile was also characterized by high levels of goals driven by social concern, but only average levels of affiliation-related goals. This suggested that although social goals were important for this profile, it was not for affiliative purposes. Similarly, this profile was characterized by moderately high levels of extrinsic goals driven by the pursuit of praise, but by moderately low levels of extrinsic goals related to token rewards. We used the label "*Mastery-Caring*" to describe this profile, which characterized mastery-oriented students who wanted to help other students and sought recognition for their strong grasp of school content. This profile represented close to 20% of the Non-Indigenous Australian (19%) and Indigenous (23%) samples, but was slightly more prevalent among Eastern students (26%).

The second profile was characterized by average levels of mastery goals (task involvement, effort), but high scores on performance (competition, social power) and extrinsic (praise, token reward) goals. This profile was also characterized by moderately high levels of affiliation goals, but moderately low levels of social concern goals. We used the label "*Performance-Extrinsic*" to describe this profile, which described performance-oriented students seeking rewards for their performance. For these students, moderately high levels of affiliative goals suggested that they would not hesitate to work collaboratively should this help them to achieve high levels of performance. This profile was relatively frequent, particularly among Indigenous (26%) and Eastern (25%) students, whereas it was slightly less prevalent among Non-Indigenous Australian students (16%).

Profile 3 was characterized by very low to moderately low scores on all achievement goals and was labelled "*Unmotivated*". This profile was far less prevalent among Indigenous and Eastern (9%) students than among Non-Indigenous Australian students (19%). In contrast, Profile 4 presented the opposite pattern of scores, being characterized by moderately high to very high levels on all achievement goals. This "*Fully Motivated*" profile characterized a relatively high proportion of Eastern (19%) students, and was less prevalent among Indigenous students (12%). However, although fewer Non-Indigenous Australian students presented an *Unmotivated* profile when compared to the other groups, very few of them corresponded to this *Fully Motivated* profile (4%).

Although Profile 5 had a different structure across cultural groups, results revealed more similarities than differences. Thus, this profile was characterized by moderately low levels on most achievement goals across all cultures. Across all cultures, levels of mastery (task involvement, effort), affiliation (a social goal), and praise (an extrinsic goal) goals remained low. Among key differences, performance goals (competition, social power) were highest among Eastern students, lowest for Non-Indigenous Australians, and in between (above average social power but below average competition) for Indigenous students. Social concerns goals were close to average among Non-Indigenous Australians, but low to very low for Eastern and Indigenous students. Finally, although levels of token reward goals remained low for all cultural groups, they were particularly low for Non-Indigenous Australians. Overall, based on similarities across groups, we used the label "*Moderately Unmotivated*" to describe this profile, noting, however, that the key driver of motivation for this profile differed across cultural groups: Social concern for Non-Indigenous Australian students (*Socially Concerned Moderately Unmotivated*), performance for the Eastern students (*Performance-Driven Moderately Unmotivated*), and social power for Indigenous students (*Social Power-Driven Moderately Unmotivated*). It is noteworthy that for Indigenous students presenting moderately low levels of motivation, the key driver of achievement appeared to be a desire to achieve some level of social power. This *Moderately Unmotivated* profile was the largest among Non-Indigenous Australian (39%) and Indigenous (35%) students, but much smaller (20%) for Eastern students.

3.3 Predictive Similarity of the Profiles

Predictors were added to the final model of partial distributional similarity. We first estimated a model in which the associations between the predictors and the probabilities of membership into the profiles were freely estimated across cultural samples, and contrasted this model with one in which these relations were constrained to equality across samples (i.e., predictive similarity). As shown in Table 2, the model in which these associations were constrained to equality across cultural groups resulted in lower values for the AIC, CAIC, BIC, and ABIC, thus supporting the predictive similarity of the model. This result supported the previous observation that the fifth profile presented more similarities than differences across cultural groups by showing that it related similarly to predictors.

Results from the multinomial logistic regressions estimated as part of this model are reported in Table 4. This Table includes the logistic regression coefficients and odds ratios (ORs) associated with each possible pairwise comparison between profiles. The regression coefficients reflect the increase, for each unit increase in the predictor that can be expected in the log odds of the outcome (i.e., the probability of membership in one profile versus another). The ORs rather reflect the change in likelihood of membership in a target profile versus a comparison profile associated for each unit of increase in the predictor. For example, an OR of 3 suggests that each unit of increase in the value of the predictor is associated with participants being three times more likely to be a member of the target profile (versus the comparison profile). ORs under 1 corresponds to negative logistic regression coefficients and suggest that the likelihood of membership in the target profile is reduced (e.g., an OR of .5 shows that a one unit increase in the predictor reduces by 50% the likelihood of being a member of the target versus the comparison profile).

Higher levels of school valuing were associated with a greater likelihood of membership into Profile 4 (*Fully Motivated*) relative to Profile 2 (*Performance-Extrinsic*) and 5 (*Moderately Unmotivated*), as well as into Profile 1 (*Mastery-Caring*) relative to Profile 5 (*Moderately Unmotivated*). Students who perceived their teacher as more supportive had a greater likelihood of membership into Profile 4 (*Fully Motivated*) relative to Profiles 1 (*Mastery-Caring*), 2 (*Performance-Extrinsic*), and Profile 5 (*Moderately Unmotivated*). Furthermore, higher levels of positive affect toward school was related to a greater likelihood of membership into Profile 4 (*Fully Motivated*) relative to Profiles 2 (*Performance-Extrinsic*) and 5 (*Moderately Unmotivated*). Levels of positive affect toward school were also associated with a greater likelihood of membership into Profile 2 (*Performance-Extrinsic*) relative to Profile 5 (*Moderately Unmotivated*). Although positive peer influence was not related to profile membership, students who perceived more negative influence from their peers had a greater likelihood of membership in Profile 2 (*Performance-Extrinsic*) relative to Profiles 1 (*Mastery-Caring*) and 5 (*Moderately Unmotivated*), but also into Profile 4 (*Fully Motivated*) relative to Profile 1 (*Mastery-Caring*). Finally, neither parental level of academic support nor their negative attitudes toward school was associated with profile membership.

Taken together, these results suggest that positive school experiences, defined in terms of school valuing, positive affect toward school, and perceptions of teacher support presented a strong association with greater likelihood of presenting a *Fully Motivated* profile relative to most of the other profiles. School valuing proved to be strongly associated with the likelihood of membership into the *Mastery-Caring* profile relative to the *Moderately Unmotivated* profile. Having a positive level of school affect was also associated with a higher likelihood of membership into the *Performance-Extrinsic* relative to the *Moderately Unmotivated* profile. Most of the social factors occurring outside of the strict academic context had very limited associations with motivation profiles, with the exception of negative peer influence, which was associated with a higher likelihood of membership in the *Performance-Extrinsic* profile, but also a greater likelihood of being into the *Fully Motivated* profile rather than in the *Mastery-Caring* profile.

3.4 Explanatory Similarity of the Profiles

Outcomes, which were assessed two years after the achievement goals, were added to the model of partial distributional similarity described earlier. We first estimated a model in which the within-profile levels of the outcomes were freely estimated across cultural samples and contrasted this model with one in which these levels were constrained to be equal across cultural groups (explanatory similarity). As shown in Table 2, the model in which the within-profile levels of outcomes were constrained to equality across cultural groups resulted in lower values for the CAIC, BIC, and ABIC, supporting the complete explanatory similarity of the model. This result again supports the observation that the fifth profile presented more similarities than differences across cultural groups, showing that it related similarly to outcomes across cultural groups. A summary of the profile comparisons on these outcome variables are reported in Table 5.

Surface learning was lower in Profile 1 (*Mastery-Caring*) than in Profile 2 (*Performance-Extrinsic*), Profile 4 (*Fully Motivated*), and Profile 5 (*Moderately Unmotivated*). No significant difference was observed between Profile 1 and Profile 3 (*Unmotivated*) or between profiles 2, 3, 4 and 5. In contrast, deep learning was lowest in Profiles 3 (*Unmotivated*) and 5 (*Moderately Unmotivated*), and highest in Profile 4 (*Fully Motivated*) in comparison to all other profiles. Profiles 1 (*Mastery-Caring*) and 2 (*Performance-Extrinsic*) did not differ significantly from one another. Considering future expectations, high school expectations were highest in Profiles 1 (*Mastery-Caring*) and 4 (*Fully Motivated*) than in the remaining profiles. Profiles 2, 3, and 5 showed very few significant differences between one another, with the exception of Profile 2 (*Performance-Extrinsic*), which presented higher levels of high school expectations than Profile 5 (*Moderately Unmotivated*). Profiles presented the same pattern of differences on future expectations related to university, job, family, and society showing higher levels in Profile 1 (*Mastery-Caring*) and Profile 4 (*Fully Motivated*), which did not differ from one another. Lower levels were observed in Profiles 2 (*Performance-Extrinsic*), 3 (*Unmotivated*) and 5 (*Moderately Unmotivated*), which did not differ from one another.

Overall, these findings suggested that *Fully Motivated* and *Mastery-Caring* oriented students experienced the highest levels of positive outcomes of all profiles. They both presented higher future expectations across the five domains considered. The *Fully Motivated* students were also more likely to use deep learning strategies, whereas the *Mastery-Caring* oriented students were less likely to use surface learning. Surprisingly, students from the *Performance-Extrinsic* profile tended to experience similar outcomes than students from the unmotivated profiles, with the exception that they presented higher levels of deep learning and of high school expectations than *Moderately Unmotivated* students.

4. Discussion

Based on a multiple goal perspective, we investigated the extent to which students' achievement goal profiles, their predictors, and their outcomes generalized across five distinct cultural groups using a newly developed framework for exploring profile similarity across multiple groups. Our results revealed five qualitatively and quantitatively distinct profiles in each cultural group and showed that at least four of these profiles were structurally identical across cultures. However, the relative prevalence of all profiles and the structure of the fifth profile presented slight differences across three broad cultural groups composed of Non-Indigenous Australians, Indigenous (Australians, Americans) and Eastern (Middle-Easterners, Asians) students. Although this fifth profile differed across cultures, it remained more similar than different, a similarity that was reinforced by the fact that all five profiles presented similar relations with predictors and outcomes across cultures. The similarity between our person-centered results and those from previous variable-centered studies is very informative. Our results provide convergent validity for the earlier observation that motivational variables drawn from PIT appeared to be universal, thus strengthening the importance of considering their relative salience in the prediction of valued educational outcomes. Although this support to cross-cultural generalization is important, our results also underscore cultural differences. Moreover, they provide additional information on how achievement goals coalesce into meaningful profiles, on the conditions associated with the likelihood of membership in those profiles, and on how these profiles predict significant educational outcomes. These results from person-centered analyses represent a significant advancement in both theory and applied value of the research. In the next sections, we first examine the nature of the profiles before moving on to a more detailed discussion of their predictors and outcomes. We then present the implications and limitations of our results.

4.1 Achievement Goal Profiles From a Cross-Cultural Perspective

Our analyses revealed five distinct profiles for each cultural group, which were highly similar across groups, providing at least preliminary support to the universality of achievement goal profiles. Four of these profiles were found to present the same structure (within-profile means) and dispersion (within-profile variance) across cultures. These profiles respectively characterized mastery-oriented students seeking to help other students and to be recognized for it (Profile 1: *Mastery-Caring* profile), performance-oriented students seeking to be rewarded for their performance (Profile 2: *Performance-Extrinsic*), *Unmotivated* (Profile 3) students presenting low levels of achievement goals, and *Fully Motivated* (Profile 4) students. The fifth profile characterized *Moderately Unmotivated* (Profile 5) students and was found to be partially distinct across cultural groups, suggesting that the key driver of motivation in this profile was culturally-differentiated. For Non-Indigenous Australians, the key driver of motivation in this profile was social concerns (*Socially Concerned Moderately Unmotivated*), or a desire to help other students. In contrast, performance goals emerged as the key driver of motivation for this profile (*Performance-Driven Moderately Unmotivated*) among Eastern students (Middle-East, Asia). Finally, Indigenous (Australian and American) students from this profile appeared mainly driven by a desire to achieve social power (*Social Power-Driven Moderately Unmotivated*).

Although Korpershoek et al. (2015) and Shim and Finch (2014) did not simultaneously consider all eight dimensions of achievement goals described in the PIT, the profiles they reported share many similarities with those identified in the present study. Indeed, both of these earlier studies identified a clear pattern (corresponding to two to three of the profiles) characterized by high levels of mastery and social goals coupled with relatively low levels of performance goals, which is similar to the pattern observed in our *Mastery-Caring* profile. However, by considering two facets of each goal, our results further revealed that the social concern (i.e., helping others) component of social goals was particularly marked in this profile when compared with the affiliation component (i.e., working with others). Thus, for this profile, helping others seemed to represent a preferred manner through which to validate and express task mastery. This group also appeared to be seeking a certain degree of validation through the eyes of others, as it presented a relatively high desire for social recognition.

Like us, Korpershoek et al. (2015) also identified a *Performance-Extrinsic* profile characterized by higher levels of performance and extrinsic goals relative to the other goals. In the current study, this profile presented a moderately high level of affiliation goals, suggesting that affiliation (i.e., desire to work in groups) may represent a favored way of demonstrating performance and perhaps ascertaining some form of social leadership. Working with others might thus provide additional opportunities for social comparison and being placed in charge of a group. Although Shim and Finch (2014) did not identify a similar profile, these authors did not systematically assess extrinsic goals.

All three studies identified profiles characterized by high (Korpershoek et al., 2015) or moderately high (Shim & Finch, 2014) levels on all goals, corresponding to the *Fully Motivated* profile, as well as by low levels on all three goals, corresponding to the *Unmotivated* profile. When we carefully look at the three profiles characterized by globally low levels of achievement goals in Korpershoek et al.'s (2015) study, two of these profiles presented particularly low levels of performance and extrinsic goals, a pattern in line with the characteristics of the *Unmotivated* profile identified here. A similar set of four profiles was also identified in previous cluster analytic studies solely based on the classical dichotomy between mastery and performance goals, which have generally identified a mastery-dominated profile, a performance-dominated profile, an unmotivated profile, and a fully motivated profile (e.g., Daniels et al., 2008; Wormington & Linnenbrink-Garcia, 2016).

The results from Korpershoek et al. (2015) and Shim and Finch (2014) also showed noteworthy differences with the present results, which could in part be explained by the consideration of a wider range of cultural groups, as well as the reliance on more refined methodologies. Most importantly, neither Shim and Finch (2014) nor Korpershoek et al. (2015) identified a profile corresponding to the *Moderately Unmotivated* profile. Arguably, a similar profile is probably nested with the two (Shim & Finch, 2014) or three (Korpershoek et al., 2015) relatively unmotivated profiles identified in these previous studies. This interpretation is reinforced by the fact that Shim and Finch (2014) found that one of their generally unmotivated profiles was characterized by relatively higher levels of social goals. This corresponds to the specific characteristics of the *Moderately Unmotivated* profiles that we identified among Non-Indigenous Australian students (*Socially Concerned Moderately Unmotivated*), arguably the cultural group presenting the greatest level of similarity with Shim and Finch's (2014) European sample. In contrast, among Indigenous students, this profile appeared to be dominated by the willingness to use achievement as a way to achieve social power (*Social Power-Driven Moderately Unmotivated*). Among students from an Eastern background, this profile appeared to be dominated by performance goals (*Performance-Driven Moderately Unmotivated*). Still, it should be kept in mind that Shim and Finch (2014) operationalization of social goals focus on social competence and differed from the one offered by the ISM.

The profile structure remained identical (for the first four profiles) or highly similar (for the fifth profile) across cultures, which provided strong support to the universality of these profiles. This similarity in profile structure also supported the ability of a holistic person-centered approach to achieve a more generic picture of achievement goal configurations than what can be obtained when considering achievement goals in isolation. Indeed, previous research focusing on achievement goals considered individually has shown that performance goals may be more pronounced in collectivist Eastern cultures, that mastery goals may be more frequently endorsed in egalitarian cultures, and that social or extrinsic goals may be more prevalent in collectivist or indigenous cultures (Ali et al., 2014; Dekker & Fisher, 2008; King & McInerney, 2014; King, McInerney, et al., 2012; Magson et al., 2014; McInerney, 2008; 2012). In contrast, our results showed that a common set of achievement goal configurations emerge among students from a variety of cultural backgrounds.

Of more importance, and an advance on variable-centered research reported earlier, was the observation that the relative size of the profiles differed across cultural groups. For instance, Non-Indigenous Australians students were significantly less likely to belong to the *Fully Motivated* profile (3.8%), in comparison to Indigenous (12.0%) and Eastern (19.3%) students. In general, profiles presenting the highest levels of social goals (Mastery-Caring and *Fully Motivated*) were more frequent among students coming from the more collectivistic Eastern cultures, which was in line with results from previous variable-centered studies (King, McInerney, et al., 2012; King & Watkins, 2012). The person-centered approach also provided additional information, showing that high level of social concern was accompanied by high levels on both mastery goals.

In addition, the proportion of Non-Indigenous Australians students was relatively high in the *Unmotivated* profile while the proportion of Eastern students was rather low in the *Moderately Unmotivated* profile. Taken together, the *Unmotivated* and *Moderately Unmotivated* profiles appeared to be particularly overrepresented among Non-Indigenous Australians (57.5%) and Indigenous (43.2%) students, but less salient among Eastern (29.3%) students. This finding that a great proportion of students were *Unmotivated*, especially in the sample of Non-Indigenous Australians, was made visible through the reliance on a person-centered approach. In other studies in which similar profiles were reported, they characterized about a third of the sample among Western (Europeans or Americans) students (Korpershoek et al., 2015; Shim & Ryan, 2014; Watkins & Hattie, 2012). This apparent discrepancy with previous results suggests that the label *Moderately Unmotivated* may fail to capture the exact nature of this profile and support the need to more carefully examine the key drivers of achievement within this profile.

This *Moderately Unmotivated* profile was the one for which cultural differences in structure were observed. First, among Non-Indigenous Australians, this profile appeared dominated by a tendency to care for other students and a willingness to help others with their schoolwork. In contrast, among Eastern students, this profile appeared to be driven by performance objectives including both competition and social power. Finally, among Indigenous students, the key driver of motivation in this profile appeared to be the desire to achieve social power through achievement. These cultural differences were unveiled through the use of a person-centered approach. For instance, variable-centered studies, which treat the sample as a whole, showed that social goals also tend to be more salient in collectivist cultures and among indigenous populations (King & McInerney, 2014; King, McInerney, et al., 2012; Magson et al., 2014; McInerney, Fasoli, et al., 2012). In contrast, when considering potential subpopulations of students, our results indicated that among *Moderately Unmotivated* students, social goals were higher for the Non-Indigenous Australians. Other cultural differences in the *Moderately Unmotivated* profiles were also coherent with variable-centered research showing that performance goals tended to be more pronounced in collectivist cultures (Dekker & Fischer, 2008; McInerney, 2008), whereas social power goals tended to be more pronounced within indigenous populations (Magson et al., 2014; McInerney, 2008, 2012). Given the high level of social disadvantage that typically characterizes indigenous populations (e.g., Cooke, Mitrou, Lawrence, Guimond, & Beavon, 2007; SCRGSP, 2014), it was not so surprising to observe that the quest for social power represented a key driver of achievement among Indigenous students when other achievement goals are low. Similarly, given that Eastern cultures tend to be more hierarchical (leading to a greater need to “succeed”) and embedded (leading to more social pressure to achieve), competition and social power could represent key drivers of achievement for Eastern students lacking other forms of motivational drivers (Dekker & Fischer, 2008).

4.2 Facilitating Conditions and Achievement Goal Profiles

Lately, many researchers have started to point out the lack of research on the predictors and outcomes of achievement goal profiles (Linnenbrink-Garcia et al., 2012; Maehr & Zusho, 2009; Murayama et al., 2012). Our findings show that various facilitating conditions were related to the likelihood of membership in some profiles relative to others and that these associations were similar across cultural groups, attesting to the cross-cultural robustness of the results. First, our results showed that ascribing value to schooling, feeling sufficiently supported by teachers, and experiencing positive affects (interest, enjoyment) toward school work were all associated with a greater likelihood of corresponding to a *Fully Motivated* profile. Believing that school is important for the future (valuing school) was also associated with a greater likelihood of corresponding to the *Mastery-Caring* profile versus the *Moderately Unmotivated* profile. These results were consistent with the results from previous variable-centered research showing these facilitating conditions to be associated with higher levels of motivation, feelings of competence, and endorsement of mastery goals (which are highest in this profile) (e.g., Chouinard et al., 2007; Ganotice et al., 2013; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Hardre & Reeve, 2003). Showing interest and enjoyment toward school also increased the likelihood of membership in the *Performance-Extrinsic* profile versus the *Moderately Unmotivated* profile. This result suggested that the experience of positive emotions at school can also encourage students to aim for success, which is often defined in terms of social comparison, praise, or rewards within the school environment.

Negative peer influence was associated with a greater likelihood of membership in the *Performance-Extrinsic* profile, but also of being in the *Fully Motivated* profile rather than in the *Mastery-Caring* profile. This last result suggested that otherwise motivated students may be less likely to help their peers to do well at school when these peers fail to value school. These social interactions with peers who do not value school also seemed to be associated with a greater likelihood of being in a profile with high level of performance and extrinsic goals, potentially through encouraging the development of a more competitive climate among students.

Finally, other social factors occurring outside of the strict academic environment (i.e., positive peer influence, parental support, and parental negative attitude toward school) did not appear to be associated with profile membership. This result was consistent with previous research showing that parental influence on school adaptation tends to fade out as children move into high schools and become adolescents (Larson & Richards, 1991; Steinberg & Silverberg, 1986). However, research also showed that as one gets older, particularly during the post high school transition, having the possibility to affiliate with peers who equally value education is likely to have beneficial effects on academic adaptation, perseverance, and attainment (Choy, Horn, Nuñez, & Chen, 2000; Pittman & Richmond, 2008). Unfortunately, this developmental interpretation could not be evaluated in the current study and will need to be examined more thoroughly in future studies.

4.3 Achievement Goal Profiles Outcomes

Although results from previous studies have sometimes shown cultural differences in the ways specific achievement goals were related to a variety of educational outcomes, the bulk of results from these studies indicated that relations between achievement goals and outcomes tended to generalize across cultural groups (Hulleman et al., 2010; King, Ganotice, et al., 2012; McInerney, 2008; McInerney et al., 1998; Zusho & Clayton, 2011). To our knowledge, the present study is the first to show that achievement goal combinations also lead to similar outcomes across cultural groups. Indeed, we found clear cross-culturally generalizable relations between membership into the achievement goal profiles and measures of students' learning processes and future expectations taken two years later.

Our results showed that the two profiles characterized by relatively high levels of mastery, social concern, and praise goals were accompanied by more positive outcomes. Thus, members of the *Fully Motivated* or *Mastery-Caring* profile equally expressed more positive future expectations across the five domains considered here (High school, University, Job, Family and Society) than students corresponding to the other profiles. Moreover, the students from the *Fully Motivated* profile showed an additional benefit, as they were more likely to use deep learning strategies than students from any other profile, including the *Mastery-Caring* one. These results are consistent with those from previous variable-centered research showing that higher levels of mastery or social goals were associated with deep learning strategies (King et al., 2010; King, McInerney, et al., 2012; Watkins, McInerney, & Lee, 2002) and that higher levels of mastery goals were associated with higher educational aspirations (McInerney, 2008) and belief of personal academic success (McInerney et al., 1998). Similarly, Shim and Finch's (2014) person-centered results showed that the most desirable outcomes to be associated with the combination of higher levels of mastery and social goals. However, these authors did not identify a profile presenting high levels on all goals. Here, the advantage of the *Fully Motivated* over the *Mastery-Caring* profile in terms of deep learning strategies is in line with previous research showing the benefits of endorsing multiple goals (Barron & Harackiewicz, 2001; Bouffard et al., 1995; Dela Rosa & Bernardo, 2013; Korpershoek et al., 2015; Pintrich, 2000; Wentzel, 1993). These results thus suggested that endorsing high levels of various achievement goals may have a bolstering effect on the use of deep learning strategies, which does not extend to surface learning, as the *Mastery-Caring* profile is the only one in which these later strategies were significantly lower.

In contrast, the *Unmotivated* and *Moderately Unmotivated* profiles were associated with the lowest levels of every outcome (with the exception of surface learning). This result is consistent with results from previous studies of goal combinations, which have shown that students with low or average levels on most goals tended to present poorer academic outcomes (Dela Rosa & Bernardo, 2013; Korpershoek et al., 2015; Shim & Finch, 2014; Wentzel, 1993; Wormington & Linnenbrink-Garcia, 2016). Students from the *Performance-Extrinsic* profile only showed higher levels of reliance on deep learning strategies and higher school expectations in comparison to both of the unmotivated profiles. Although not assessing extrinsic goals, Wormington and Linnenbrink-Garcia (2016) also reported no benefit of pursuing performance goals on their own. In the current study, this result could be related to the choice of outcomes. Five out of seven outcomes assessed future expectations, operationalized as students' confidence in their ability to succeed in various domains. A focus on outperforming peers in a competitive manner, as well as on obtaining token rewards for performance, is inherently short-term and may limit the ability to focus on long-term expectations, while ensuring short-term achievement. Another interpretation comes from the observation that performance and extrinsic goals tended to be associated with higher levels of anxiety (Linnenbrink, 2005; Wolters, Yu, & Pintrich, 1996), which themselves are known to generate worries and negative future expectations, while still being associated with satisfactory levels of achievement (Åström, Wiberg, Sircova, Wiberg, & Carelli, 2014; MacLeod & Byrne, 1996). Further research integrating social and extrinsic goals is needed to replicate our results, to extend them to a wider range of outcomes, and to better understand the processes underlying these relations.

4.4 Theoretical, Practical, and Methodological Implications

This study is the first to rely on a person-centered approach to investigate potential combinations of the eight achievement goals assessed by the ISM. The strength of this approach over variable-centered analyses is that the latter cannot provide information on salient configurations of variables within specific profiles of participants and on how these combinations serve to enhance desirable educational outcomes. Our results extend and support the multiple goals perspective, suggesting that students not only benefit more from endorsing both mastery and performance goals, but also social and extrinsic goals, particularly when these goals are endorsed in combination. By assessing eight specific goals, our results also unveil that the two facets of a same type of goal (e.g., affiliation and social concern for social goals) can be endorsed differently. Our findings show the advantages of adopting a more holistic person-centered representation of achievement goals to obtain a clearer picture of the specific configurations of achievement goals that may emerge within individual students, and a broader understanding of the combined effects of achievement goals on educational outcomes than can be achieved in traditional variable-centered research exploring goals in isolation (Harackiewicz et al., 2002; Pintrich, 2000).

To our knowledge, the present study is also the first to rely on a methodological approach allowing us to conduct a systematic comparison of achievement goal profiles across students from various cultural backgrounds. One important contribution of our results is to show that the nature of the observed profiles, as well as their relations with predictors and outcomes, proved to be quite generalizable across five distinct cultural groups, providing at least preliminary support to the universality of our results. Although the profiles themselves were similar across cultures, our results showed that their relative frequency differed across cultures. Researchers could look more carefully at the cultural mechanisms involved in these variations in order to inform future interventions aiming to encourage the development of the most desirable motivation profiles among students. Our results suggest that one profile presented cultural variations in terms of structure, showing that the key driver of achievement motivation changed as a function of culture among otherwise moderately unmotivated students: social concern for Non-Indigenous Australians, social power for Indigenous students, and performance for Eastern students. This observation reinforces the value of adopting the multiple goals perspective proposed by PIT in cross-cultural studies of achievement motivation.

Our results further suggest that high levels of mastery goals tend to be accompanied by high levels of social concern goals (a combination that appeared desirable in terms of outcomes), while high levels of performance goals tended to be accompanied by high levels of extrinsic goals (a combination that appeared particularly harmful in terms of outcomes). However, when all types of goals are endorsed together, a positive synergistic effect may occur and lead to the most positive outcomes of all. According to our findings, the two most desirable profiles (*Fully Motivated* and *Mastery-Caring*) shared common predictors, suggesting that school-based interventions aiming to improve students' motivational profiles could focus on a common set of actions in order to encourage the development of both types of profiles. More specifically, in order to improve the likelihood of membership in these profiles, interventions could aim to enhance the instrumental value that students attach to school and the support provided by teachers. Finding ways to increase the perceived utility of school might also compensate for negative peer influence. Interventions could particularly target students who adopt negative views about schooling. Finally, it appears from our results that high levels of performance and extrinsic goals were only detrimental when they were not accompanied by high levels of mastery and social concern goals. Intervention should thus focus on increasing those latter goals rather than reducing performance and extrinsic goals (see also Senko, Hama, & Belmonte, 2013; Wormington & Linnenbrink-Garcia, 2016, for similar conclusion). Clearly, future studies should pay closer attention to the specific combinations of goals identified here, investigate more completely the extent to which their positive of negative effects generalize to different outcomes than those considered here, and look more carefully at which variables differentially predict the development of our two most desirable profiles.

4.5 Limitation and Areas for Further Research

Five limits should be kept in mind with interpreting our results. First, we only assessed the approach dimension of achievement goals, whereas recent research has shown the added value of also considering their avoidance dimension (Murayama et al., 2012; Wormington & Linnenbrink-Garcia, 2016). Although this decision was supported by our choice to rely on a more extensive set of goal facets proposed by PIT and operationalized in the ISM, an instrument of known cross-cultural generalizability, it would be highly informative for future researchers to investigate more thoroughly how the current results generalize to the consideration of the avoidance dimension of achievement goals (Elliot, Gable, & Mapes, 2006; Roussel, Elliot, & Feltman, 2011; Ryan & Shin, 2011). In particular, cultural differences may be more apparent when considering the avoidance dimension, which was previously found to be more salient among students from collectivist cultures (Elliot, Chirkov, Kim, & Sheldon, 2001; Zusho, Pintrich, & Cortina, 2005). Still, any research development in this regard will need to face important psychometric challenges in order to ascertain that approach-avoidance ratings of a variety of goals preserve the same meaning across a variety of cultural groups.

Second, a limited set of predictors and outcomes was investigated in this study and assessed solely based on participants' self-reports. Self-reports were appropriate for this study given our interest in intrapsychic processes (Howard, 1994; Paulhus & Vazire, 2007), such as goals, perceptions, and expectations. In addition, with the sole exception of the known added-value of objective achievement indicators, self-reported measures remain the preferred indicators in person-centered studies of achievement goal profiles and their covariates given their focus on intra-personal goal configurations (Wormington & Linnenbrink-Garcia, 2016). Moreover, given that our mutligroup LPA approach required a substantial number of participants per cultural group, the practical usefulness of self-reported measures is undeniable, even when assessing concepts such as learning strategies (Schellings & Van Hout-Wolters, 2011) that could also have been captured through other methods like specific task assessment (Cassidy, 2004). Nevertheless, we acknowledge that our understanding of these distinctive profiles could benefit from relying on a wider range of self-reported and more objective indicators and covariates. For instance, additional outcomes such as academic achievement, high school completion, university enrollment, help-seeking behaviors, wellbeing, and test anxiety could show a different pattern of association with the identified profiles and could facilitate comparison with findings from previous multiple goals studies. The inclusion of additional predictors such as perceived competence, a central variable in various motivational theories, could also improve our understanding of the emergence of these profiles.

Third, although we used two measurement points, predictors were assessed at the same time as the achievement goals and the achievement goals were not reassessed at the second measurement point. More complex longitudinal designs in which predictors, profile indicators, and outcomes are all assessed at multiple time points would be necessary to assess the stability of the observed profiles over time, and to more precisely assess the temporal ordering of the estimated relations. Fourth, while the current results provide evidence of cultural generalizability across cultures, it must be kept in mind that all students forming the present sample were recruited within Western countries, which may have contributed to buffer the expression of cultural differences as students from these various cultural groups were embedded within the same overarching national culture, language (i.e., English), and school system. Additionally, as the data were collected in 2001-2004, they might not entirely reflect the actual cultural differences and similarities on achievement goals and their predictors/outcomes in more contemporary school settings.

Fifth, it should be noted that person-centered research evidence needs to be built from an accumulation of studies, given that the ability to identify specific profiles (especially smaller ones) is dependent on the size and representativeness of the available sample (Solinger, Van Olffen, Roe & Hofmans, 2013). Thus, additional studies are needed to replicate the current results, within larger and even more representative samples. Nevertheless, our profiles matched those obtained in recent research based on a smaller set of goals (Korpershoek et al., 2015; Shim & Finch, 2014).

5. Conclusion

This study represents an important first step in the investigation of cross-cultural differences in achievement goal profiles and provides a statistical methodology to help future cross-cultural research in this area. However, it remains critically important for future studies to more systematically investigate cross-cultural variations among students from even more diverse cultural, linguistic, or national backgrounds. Importantly, hypotheses drawn from the present findings should be tested with new data collected within an even wider variety of cultural groups living in non-Western countries.

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Table 1

Correlations Between all Variables (Factor Scores)

	TASK	EFFO	COMP	SPOW	AFFI	SCON	PRAIS	TOKEN	SCVAL	PARSU	TEASU	PARNE	AFSC
TASK	*.60*												
EFFO	.49**	*.82*											
COMP	.10**	.33**	*.74*										
SPOW	-.03	.14**	.63**	*.84*									
AFFI	.17**	.26**	.22**	.41**	*.73*								
SCON	.41**	.54**	-.06**	-.07**	.18**	*.72*							
PRAIS	.41**	.68**	.50**	.39**	.42**	.39**	*.80*						
TOKEN	.21**	.31**	.57**	.59**	.42**	.03	.65**	*.83*					
SCVAL	.47**	.70**	.20**	.05**	.21**	.43**	.51**	.19**	*.87*				
PARSU	.24**	.39**	.15**	.21**	.29**	.23**	.41**	.27**	.43**	*.84*			
TEASU	.33**	.60**	.25**	.23**	.28**	.40**	.54**	.33**	.60**	.63**	*.81*		
PARNE	-.25**	-.27**	.08**	.12**	.02	-.07**	-.11**	.01	-.46**	-.14**	-.21**	*.67*	
AFSC	.30**	.69**	.27**	.22**	.10**	.40**	.49**	.31**	.58**	.30**	.55**	-.17**	*.68*
NPEER	-.20**	-.19**	.12**	.25**	.11**	-.21**	-.06**	.17**	-.34**	.03	-.04*	.50**	-.18**
PPEER	.17**	.25**	.07**	.18**	.23**	.15**	.27**	.21**	.33**	.13**	.29**	-.06**	.22**
SURF	-.08**	-.12**	.10**	.11**	.14**	-.15**	.02	.11**	-.09**	.00	-.08**	.10**	-.15**
DEEP	.11**	.27**	.13**	.20**	.15**	.05	.20**	.21**	.19**	.17**	.21**	-.11**	.31**
HISC	.06*	.15**	.10**	.11**	.09**	.03	.12**	.14**	.06*	.08**	.11**	.03	.16**
UNIV	.16**	.23**	-.02	.07*	-.01	.08**	.12**	.07*	.25**	.10**	.15**	-.24**	.25**
JOB	.20**	.25**	.03	.10**	.10**	.09**	.18**	.11**	.29**	.16**	.17**	-.20**	.18**
FAMI	.20**	.26**	.06*	.10**	.10**	.08**	.20**	.13**	.27**	.18**	.19**	-.19**	.20**
SOCI	.16**	.25**	.08**	.11**	.08**	.11**	.18**	.10**	.23**	.15**	.19**	-.12**	.22**

Note. **p* < .05; ***p* < .01; TASK = Task involvement; EFFO = Effort; COMP = Competition; SPOW = Social power; AFFI = Affiliation; SCON = Social concern; PRAIS = praise; TOKEN = Token rewards; SCVAL = School valuing; PSRSU = Support from parents; TEASU = Support from teachers; PARNE = Parental negative attitude toward graduation; AFSC = Affect toward school; NPEER = Negative influence by peers; PPEER = Positive influence by peers; SURF = Surface learning; DEEP = Deep learning; HISC = High school expectations; UNIV = University expectations; JOB = Employment expectations; FAMI = Family expectations; SOCI = Society expectations. Composite reliability scores (omega) reported in the diagonal (italicized). Composite scores for scales with two items were adjusted with the Spearman-Brown formula based on eight-equivalent items.

Table 1 (continued)

Correlations Between all Variables (Factor Scores)

	NPEER	PPEER	SURF	DEEP	HISC	UNIV	JOB	FAMI	SOCI
NPEER	*.74*								
PPEER	-.14**	*.64*							
SURF	.16**	.04	*.71*						
DEEP	.03	.13**	.12**	*.74*					
HISC	.06*	.08**	.00	.61**	*.73*				
UNIV	-.18**	.15**	-.44**	.43**	.27**	*.94*			
JOB	-.11**	.18**	.03	.56**	.32**	.74**	*.87*		
FAMI	-.06*	.13**	.05	.58**	.17**	.55**	.82**	*.94*	
SOCI	-.04	.13**	.06*	.70**	.37**	.50**	.67**	.69**	*.80*

Note. **p* < .05; ***p* < .01; TASK = Task involvement; EFFO = Effort; COMP = Competition; SPOW = Social power; AFFI = Affiliation; SCON = Social concern; PRAIS = praise; TOKEN = Token rewards; SCVAL = School valuing; PSRSU = Support from parents; TEASU = Support from teachers; PARNE = Parental negative attitude toward graduation; AFSC = Affect toward school; NPEER = Negative influence by peers; PPEER = Positive influence by peers; SURF = Surface learning; DEEP = Deep learning; HISC = High school expectations; UNIV = University expectations; JOB = Employment expectations; FAMI = Family expectations; SOCI = Society expectations. Composite reliability scores reported in the diagonal (italicized). Composite scores for scales with two items were adjusted with the Spearman-Brown formula based on eight-equivalent items.

Table 2
Results from the Latent Profiles Analyses

Model	LL	#fp	Scaling	AIC	CAIC	BIC	ABIC	Entropy
5-Profile Model								
Non-Indigenous Australians (*n*=883)	-7633.36	84	1.39	15434.72	15920.52	15836.52	15569.75	Na
Indigenous Australians (*n* = 333)	-2867.44	84	1.25	5902.88	6306.77	6222.77	5956.31	0.90
Indigenous Americans (*n* = 743)	-6292.57	84	1.25	12753.14	13224.44	13140.44	12873.71	0.82
Middle Easterners (*n* = 363	-3332.23	84	1.20	6832.46	7243.59	7159.59	6893.09	0.85
Asians (*n*=321)	-2742.92	84	1.21	5653.83	6054.64	5970.64	5704.20	0.84
Tests of Profile Similarity								
Configural	-26871.21	424	1.20	54590.41	57507.39	57083.39	55736.22	0.92
Structural (M)	-27575.06	264	1.14	55678.11	57494.34	57230.34	56391.54	0.91
Partial Structural (part.M)	-27389.29	280	1.23	55338.58	57264.89	56984.89	56095.24	0.91
Dispersion (part.M, part.V)	-27500.93	136	1.30	55273.86	56209.50	56073.50	55641.39	0.90
Distributional (part.M, part.V, P)	-27611.76	120	1.41	55463.52	56289.08	56169.08	55787.80	0.90
Partial Distributional (part.M, part.V, Part. P)	-27526.93	128	1.36	55309.86	56190.45	56062.45	55655.76	0.90
Predictive Similarity								
Relations between predictors and profiles freely estimated	-26252.63	264	1.31	53033.26	54847.29	54583.29	53744.48	0.92
Relations between predictors and profiles invariant	-26348.27	152	2.08	53000.53	54044.97	53892.97	53410.03	0.91
Explanatory Similarity								
Relations between profiles and outcomes freely estimated	-38980.09	306	1.43	78572.18	80677.36	80371.36	79399.11	0.89
Relations between profiles and outcomes invariant	-39208.64	166	1.39	78749.28	79891.31	79725.31	79197.87	0.90

Note. *: p < .05; LL: Model LogLikelihood; #fp: Number of free parameters; Scaling = scaling correction factor; AIC: Akaïke Information Criteria; CAIC: Constant AIC; BIC: Bayesian Information Criteria; ABIC: Sample-Size adjusted BIC; M: Means; V: Variances; P: Class probabilities.

Table 3
Sizes of the Latent Profiles (%)

	Profiles				
Cultural Subgroups	1	2	3	4	5
Non-Indigenous Australians (*n* = 883)	23.00	15.79	18.77	3.76	38.68
Indigenous (*n* = 1076)	19.06	25.74	8.55	12.00	34.65
Eastern (*n* = 684)	26.22	25.14	9.42	19.32	19.90

Table 4

Results from Multinomial Logic Regressions for the Effects of Facilitating Conditions on Profile Membership

	Latent profile 1 vs. 2		Latent profile 3 vs. 2		Latent profile 4 vs. 2		Latent profile 5 vs. 2		Latent profile 1 vs. 3	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
School Valuing	0.73 (1.18)	2.07	-1.73 (3.45)	0.18	1.33 (0.28)**	3.79	-1.41 (1.24)	0.24	2.462 (2.30)	11.73
Parental Academic Support	-0.24 (0.50)	0.79	-0.93 (1.02)	0.39	-0.06 (0.14)	0.94	-0.34 (0.23)	0.71	0.692 (1.50)	2.00
Teacher Support	0.07 (0.53)	1.07	-1.17 (1.37)	0.31	0.78 (0.39)*	2.19	-0.45 (0.34)	0.64	1.235 (0.88)	3.44
Parental Negative Attitude	-0.09 (0.36)	0.91	-0.34 (0.83)	0.71	0.27 (0.18)	1.30	-0.01 (0.23)	0.99	0.245 (1.16)	1.28
Affect Toward School	0.23 (0.58)	1.26	-1.39 (2.01)	0.25	1.07 (0.35)**	2.90	-0.59 (0.15)**	0.55	1.615 (1.47)	5.03
Negative Peer Influence	-0.76 (0.12)**	0.47	-0.48 (0.62)	0.62	-0.17 (0.17)	0.85	-0.53 (0.25)*	0.59	-0.279 (0.62)	0.76
Positive Peer Influence	-0.40 (0.80)	0.67	-0.57 (0.78)	0.57	-0.06 (0.35)	0.95	-0.41 (0.31)	0.67	0.17 (1.57)	1.19
	Latent profile 4 vs. 3		Latent profile 5 vs. 3		Latent profile 1 vs. 4		Latent profile 5 vs. 4		Latent profile 1 vs. 5	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
School Valuing	3.07 (3.54)	21.43	0.32 (2.22)	1.38	-0.60 (1.27)	0.55	-2.74 (1.34)*	0.06	2.141 (0.22)**	8.51
Parental Academic Support	0.87 (1.02)	2.38	0.59 (0.82)	1.81	-0.18 (0.51)	0.84	-0.28 (0.25)	0.76	0.101 (0.69)	1.11
Teacher Support	1.95 (1.05)	7.04	0.72 (1.06)	2.06	-0.72 (0.25)**	0.49	-1.23 (0.21)**	0.29	0.512 (0.27)	1.67
Parental Negative Attitude	0.60 (0.86)	1.83	0.33 (0.63)	1.39	-0.36 (0.35)	0.70	-0.28 (0.29)	0.76	-0.080 (0.55)	0.92
Affect Toward School	2.45 (2.30)	11.59	0.79 (2.02)	2.21	-0.84 (0.88)	0.43	-1.66 (0.37)**	0.19	0.824 (0.59)	2.28
Negative Peer Influence	0.32 (0.59)	1.37	-0.05 (0.42)	0.95	-0.60 (0.17)**	0.55	-0.37 (0.25)	0.69	-0.230 (0.26)	0.79
Positive Peer Influence	0.52 (1.11)	1.67	0.16 (0.50)	1.18	-0.35 (0.49)	0.71	-0.35 (0.63)	0.70	0.006 (1.09)	1.01

Note. **: $p < .01$; *: $p < .05$. SE: standard error of the coefficient; OR: Odds Ratio. The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile.

Table 5

Associations between Profile Membership and Learning Processes and Future Expectations

Motivation	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Learning processes					
Surface	-0.30_a	0.20_b	-0.10_{ab}	0.03_b	0.04_b
Deep	-0.10_a	-0.04_a	-0.48_b	0.33_c	-0.43_b
Future expectations					
High school	0.26_a	0.01_b	-0.10_{bc}	0.46_a	-0.13_c
University	0.77_a	-0.58_b	-0.51_b	0.63_a	-0.60_b
Job	0.79_a	-0.61_b	-0.62_b	0.76_a	-0.63_b
Family	0.57_a	-0.58_b	-0.66_b	0.66_a	-0.65_b
Society	0.63_a	-0.43_b	-0.63_b	0.62_a	-0.56_b

Note. Standardized means with distinct subscripts within a row differ significantly at $p < .05$.

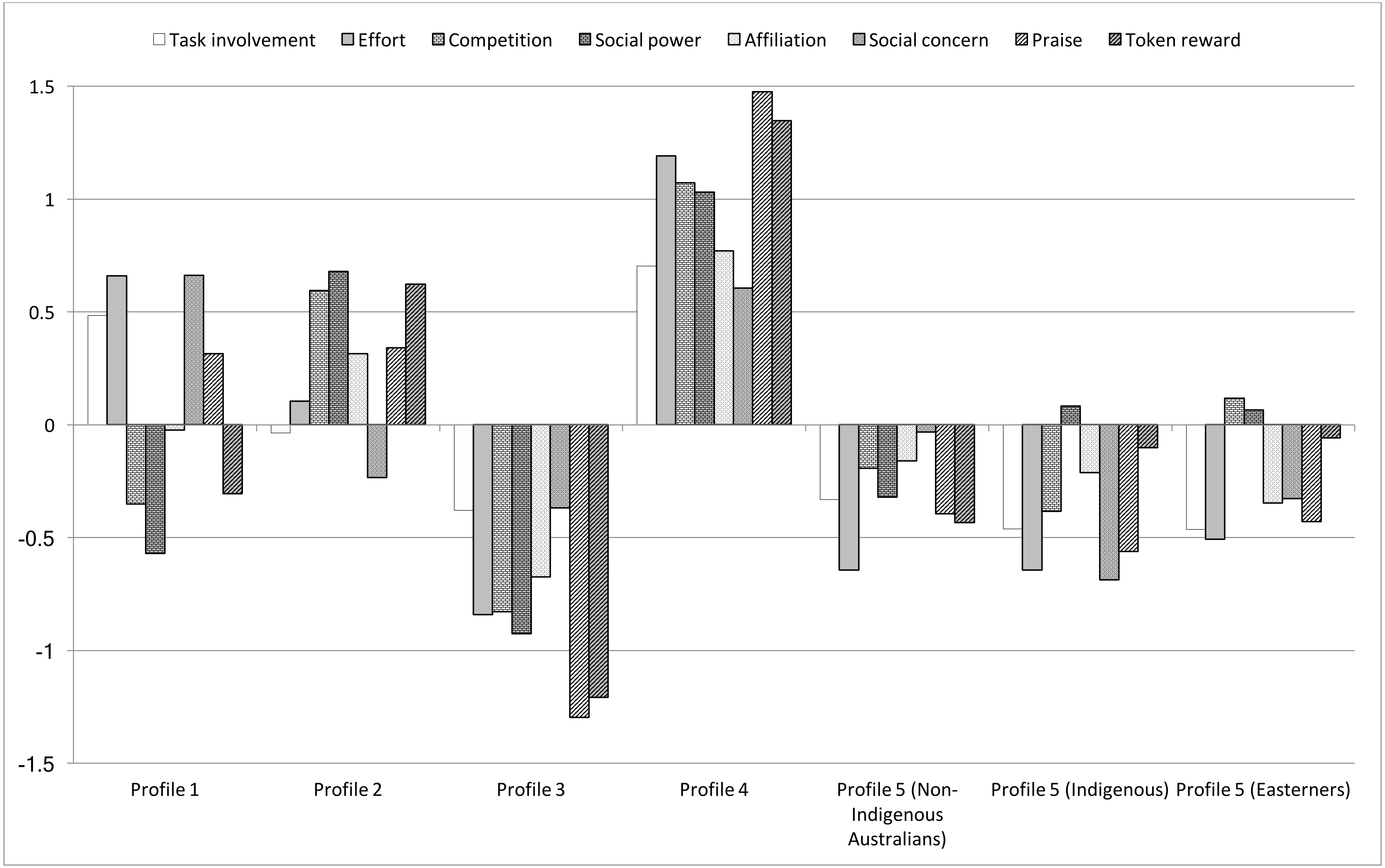

Figure 1. Profiles.

Online Supplemental Materials for:

Generalizability of Achievement Goal Profiles Across Five Cultural Groups: More Similarities than Differences

Authors' note:

These online technical appendices are to be posted on the journal website and hot-linked to the manuscript. We developed these materials to provide additional technical information and to keep the main manuscript from becoming needlessly long.

Sections

Preliminary Measurement Models and Tests of Measurement Invariance across Cultural Groups

Preliminary measurement models were estimated using Mplus 7.3 (Muthén & Muthén, 2014). Due to the complexity of the measurement models underlying all constructs assessed in the present study, these preliminary analyses were conducted separately for the achievement goals, the predictors (facilitating conditions), and the outcomes (learning strategies and future expectations). These models were estimated as multiple group models, allowing for the estimation of similar models across all cultural groups and the progressive integration of invariance constraints to the models. These models included, in each group, eight factors for the achievement goals (task involvement, effort, competition, social power, affiliation, social concern, praise, and token rewards), seven factors for the facilitating conditions (school valuing, affect toward school parental academic support, parental negative attitudes toward school, teacher support, positive peer influence, and negative peer influence), and seven factors for the outcomes (learning processes: deep and surface learning; future expectations: high school, university, employment, family, and society).

Each model was estimated using exploratory structural equation modeling (ESEM; Asparouhov & Muthén, 2009; Marsh et al., 2009; Morin, Marsh, & Nagengast, 2013). ESEM offers the possibility to integrate features of CFA, structural equation modeling (SEM), and exploratory factor analysis (EFA) in a single framework. This decision is based on the results from simulation studies (Asparouhov & Muthén, 2009; Sass & Schmitt, 2010; Schmitt & Sass, 2011) and studies of simulated data (Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013; Morin, Arens et al., 2015) showing that forcing cross loadings (even as small as .100, Marsh et al., 2013) present in the population model to be exactly zero according to typical CFA specification forces these cross loadings to be expressed through the inflation of the factor correlations. In contrast, these same studies show that the free estimation of cross-loadings, even when none are present in the population model, still provides unbiased estimates of the factor correlations (also see Asparouhov, Muthén, & Morin, 2015; Morin, Arens, & Marsh, 2015). Importantly, recent studies also conducted on motivational data have also shown the clear advantages of using an ESEM measurement model (Guay, Morin, Litalien, Valois, & Vallerand, 2015; Litalien, Guay, & Morin, 2015).

Furthermore, it is now possible to rely on a confirmatory approach to the estimation of EFA/ESEM models though the use of target rotation (Asparouhov & Muthén, 2009; Browne, 2001). Target rotation allows for the pre-specification of target loadings in a confirmatory manner, while cross-loadings are targeted to be as close to zero as possible. For the model used to estimate the predictors (i.e., facilitating conditions questionnaire), we also included a set of a priori correlated uniquenesses to control for the methodological artefact linked to the parallel wording of a subset of items (e.g., “My mother helps me with my schoolwork” and “My father helps me with my schoolwork”; Marsh, Abduljabbar et al., 2013).

All of these measurement models were estimated using the robust weighted least square estimator using diagonal weight matrices (WLSMV) to take into account the ordered-categorical rating scales underlying the various indicators used in these models. The choice to rely on WLSMV estimation is linked to the fact that this estimator is more suited to the ordered-categorical nature of the Likert scales used in the present study than traditional maximum likelihood (ML) estimation or robust alternatives (MLR) (Finney & DiStefano, 2013). Indeed, ML/MLR estimation assumes that the underlying response scale is continuous, and that responses are normally distributed. Although ML/MLR is to some extent robust to non-normality, assumptions of underlying continuity are harder to approximate when few response categories are used (simulation studies suggest five answer categories or less as the point at which WSLMV tends to outperform ML/MLR), or when response categories follow asymmetric thresholds (as is the case in this study). In these conditions, WLSMV estimation has been found to outperform ML/MLR estimation (Bandalos, 2014; Beauducel & Herzberg, 2006; Finney & DiStephano, 2013; Flora & Curran, 2004; Lei, 2009; Lubke & Muthén, 2004; Rhemtulla, Brosseau-Liard, & Savalei, 2012). It should be kept in mind that a key limitation of WLSMV, when compared to ML/MLR estimation has to do with the reliance on a slightly less efficient way of handling missing data (Asparouhov & Muthén, 2010), which is not an issue here in light of the very low level of missing data present in each of the estimated models (predictors model, from 0.6% to 4.8%, mean = 1.5%; achievement goals model, from 1.0% to 2.2%, mean = 1.4%; outcomes model from 0.3% to 0.9%, mean = 0.5%).

Before saving the factor scores for our main analyses, we verified that the measurement model operated in the same manner across cultural groups, through sequential tests of measurement invariance (Millsap, 2011): (1) configural invariance, (2) weak invariance (loadings), (3) strong invariance (loadings and thresholds), (4) strict invariance (loadings, thresholds and uniquenesses); (5) invariance of the latent variance-covariance matrix (loadings, thresholds, uniquenesses, and latent variances and covariances); (6) latent means invariance (loadings, thresholds, uniquenesses, latent variances and covariances, and latent means). For the predictors models (i.e., facilitating conditions), an additional step testing the invariance of the parallel-worded correlated uniquenesses was also include. In models relying on WLSMV estimation, thresholds replace intercepts and reflect the points at which responses change from one category to another.

Given the known oversensitivity of the chi-square test of exact fit (χ^2) to sample size and minor model misspecifications (e.g., Marsh, Hau, & Grayson, 2005), we relied on goodness-of-fit indices to describe the fit of the alternative models (Hu & Bentler, 1999; Yu, 2002): the comparative fit index (CFI), the Tucker-Lewis index (TLI), as well as the root mean square error of approximation (RMSEA) and its 90% confidence interval. Values greater than .90 for the CFI and TLI indicate adequate model fit, although values greater than .95 are preferable. Values smaller than .08 or .06 for the RMSEA respectively support acceptable and excellent model fit. Like the chi square, chi square difference tests present a known sensitivity to sample size and minor model misspecifications so that recent studies suggest complementing this information with changes in CFIs and RMSEAs (Chen, 2007; Cheung & Rensvold, 2002) in the context of tests of measurement invariance. A ΔCFI of .010 or less and a ΔRMSEA of .015 or less between a more restricted model and the preceding one indicate that the invariance hypothesis should not be rejected. It should be noted that with WLSMV, chi-square values are not exact, but rather adjusted or "*estimated*" to obtain a correct *p*-value. This explains why χ^2 and CFI values can be non-monotonic with model complexity. This specificity is also important for the WLSMV χ^2 difference tests, which need to be conducted via Mplus' DIFFTEST function (MD$\Delta\chi^2$; Asparouhov, & Muthén, 2006).

The results from these models are reported in supplementary Table S1. These results clearly support the a priori models of configural invariance. For the achievement goals, the results supported the configural, strong, strict, correlated uniquenesses, and latent variance-covariance invariance of the model, but not the invariance of the latent means (ΔCFI -.018; ΔTLI = -.017). For the predictors, the results supported the configural, strong, strict, correlated uniquenesses, and latent variance-covariance invariance of the model, but not the invariance of the latent means (ΔCFI -.011; ΔTLI = -.010). For the outcomes, the results provided clear support to the complete invariance of the model with none of the change in goodness-of-fit indices exceeding the recommended cut-off scores (ΔCFI ≤ .010; ΔTLI ≤ .010; ΔRMSEA ≤ .015; and overlapping RMSEA confidence intervals).

To ensure that the latent profiles estimated were based on fully comparable measures of outcomes across the five cultural groups, the factor scores used in the main analyses were saved from the most invariant model. Parameter estimates from these most invariant models are reported in Table S2. Although only strict measurement invariance is required to ensure that measurement of the constructs remains equivalent across time waves for models based on factor scores (e.g., Millsap, 2011), there are advantages to saving factor scores from a model of complete measurement invariance for use in latent profile analyses. Indeed, saving factor scores based on a measurement model in which both the variances and the latent means are invariant (i.e., respectively constrained to take a value of 1 and 0 in all time waves) provides scores on profile indicators that can be readily interpreted in standardized terms as deviation from the grand mean expressed in standard deviation units. For both achievement goals and predictors, the factor scores were thus saved from the model of invariant latent variances and covariances, whereas they were saved from the model of latent mean invariance for the outcomes.

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Table S1

Goodness-of-Fit Statistics of the Measurement Models

Description	$\chi^2(df)$	CFI	TLI	RMSEA	90% CI	MD $\Delta\chi^2$ (df)	ΔCFI	ΔTLI	ΔRMSEA
Achievement Goals (ISM)									
Total	830.311*(587)	.988	.982	.012	[.010, .014]	–	–	–	–
Non-Indigenous Australians	708.739*(587)	.981	.971	.015	[.011, .019]	–	–	–	–
Indigenous Australians	664.597*(587)	.984	.975	.020	[.010, .027]	–	–	–	–
Indigenous American	809.424*(587)	1.000	1.000	.023	[.019, .026]	–	–	–	–
Middle Easterners	682.789*(587)	.992	.988	.021	[.013, .028]	–	–	–	–
Asians	707.610*(587)	.983	.973	.025	[.018, .032]	–	–	–	–
Configural Invariance (same model freely estimated in all groups, no equality constraint)	4698.667*(2935)	.974	.959	.034	[.032, .035]	–	–	–	–
Loadings (Weak) Invariance	5724.450*(4055)	.975	.972	.028	[.026, .030]	1725.384*(1120)	+.001	+.013	-.006
Thresholds (Strong) Invariance	6979.366*(4535)	.963	.964	.032	[.030, .033]	1652.143*(480)	-.012	-.008	+.004
Uniquenesses (Strict) Invariance	7222.163*(4707)	.962	.964	.032	[.030, .033]	410.805*(172)	-.001	.000	.000
Latent Variance-Covariance Invariance	6639.674*(4851)	.973	.975	.026	[.025, .028]	266.685*(144)	+.011	+.011	-.006
Latent Means Invariance	7890.156*(4883)	.955	.958	.034	[.033, .036]	570.936*(32)	-.018	-.017	+.018
Predictor Models									
Configural Invariance (same model freely estimated in all groups, no equality constraint)	5013.475*(1940)	.965	.944	.055	[.053, .057]	–	–	–	–
Loadings (Weak) Invariance	5353.033*(2752)	.971	.966	.042	[.041, .044]	1640.214*(812)	+.006	+.022	-.013
Thresholds (Strong) Invariance	6298.817*(3156)	.965	.965	.044	[.042, .045]	1307.946*(404)	-.006	-.001	+.002
Uniquenesses (Strict) Invariance	6359.643*(3300)	.966	.967	.042	[.041, .044]	364.458*(144)	+.001	+.002	-.002
Correlation Uniqueness Invariance	6629.488*(3344)	.963	.965	.043	[.042, .045]	581.347*(44)	-.003	-.002	+.001
Latent Variance-Covariance Invariance	5300.421*(3456)	.979	.981	.032	[.030, .034]	179.244*(112)	+.016	+.016	-.011
Latent Means Invariance	6297.106*(3484)	.968	.971	.039	[.038, .041]	496.463*(28)	-.011	-.010	+.007
Outcome Models									
Configural Invariance (same model freely estimated in all groups, no equality constraint)	2663.980*(790)	.984	.976	.090	[.087, .094]	–	–	–	–
Loadings (Weak) Invariance	2916.726*(970)	.983	.980	.083	[.080, .087]	791.170*(180)	-.001	+.004	-.007
Thresholds (Strong) Invariance	3136.610*(1190)	.983	.984	.075	[.072, .078]	598.581*(220)	.000	+.004	-.008
Uniquenesses (Strict) Invariance	3329.019*(1278)	.982	.984	.074	[.071, .077]	573.188*(88)	-.001	.000	-.001
Latent Variance-Covariance Invariance	3711.839*(1390)	.980	.983	.076	[.073, .079]	797.749*(112)	-.002	-.001	+.002
Latent Means Invariance	4081.048*(1418)	.977	.981	.080	[.078, .083]	769.848*(28)	-.003	-.002	+.004

Note. *$p < .01$; χ^2: Chi-square; df: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval of the RMSEA; MD $\Delta\chi^2$: Chi-square difference tests.

Table S2

Standardized Parameter Estimates from the Final Measurement Models

Models	TASK		EFFO		COMP		SPOW		AFFI		SCON		PRAIS		TOKEN	
Items	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ
Goals (ISM)																
Item 1	.472	.593	.160	.67	.318	.659	.537	.473	.663	.493	.498	.551	.622	.413	.598	.561
Item 2	.528	.619	.466	.465	.415	.572	.205	.552	.593	.558	.677	.377	.540	.502	.705	.421
Item 3	.396	.435	.556	.375	.378	.65	.926	.329	.752	.42	.587	.552	.597	.491	.549	.555
Item 4	.397	.515	.722	.531	.656	.481	.821	.333			.505	.629	.689	.417	.564	.423
Item 5			.637	.486	.691	.359	.275	.42			.406	.744	.585	.484	.436	.49
Item 6			.700	.411	.542	.511	.817	.361							.550	.463
Item 7			.728	.419											.565	.433
	SCVAL		PARSU		TEASU		PARNE		AFSC		NPEER		PPEER			
	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ		
Predictors																
Item 1	.813	.685	.741	.627	.423	.422	.608	.549	.833	.651	.558	.544	.652	.542		
Item 2	.659	.396	.896	.720	.430	.504	.552	.517	.627	.585	.568	.588	.308	.426		
Item 3	.850	.672	.623	.561	.477	.446	.490	.625	.472	.499	.619	.407	.390	.431		
Item 4	.753	.703	.745	.562	.844	.654	.536	.616			.571	.373	.490	.475		
Item 5	.850	.791	.742	.635	.731	.567										
Item 6	.800	.751	.603	.589	.794	.670										
Item 7	.486	.505														
Item 8	.394	.577														
Item 9	.445	.512														
	SURF		DEEP		HISC		UNIV		JOB		FAMI		SOCI			
	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ		
Outcomes																
Item 1	.508	.740	.514	.728	.539	.457	.857	.232	.503	.372	.716	.365	.789	.508		
Item 2	.547	.696	.509	.702	.224	.415	.687	.370	.614	.401	.868	.299	.639	.413		
Item 3	.315	.720	.661	.568												
Item 4	.564	.667	.721	.480												
Item 5	.620	.621	.482	.714												
Item 6	.594	.579	.481	.735												

Note. TASK = Task involvement; EFFO = Effort; COMP = Competition; SPOW = Social power; AFFI = Affiliation; SCON = Social concern; PRAIS = praise; TOKEN = Token rewards; SCVAL = School valuing; PSRSU = Support from parents; TEASU = Support from teachers; PARNE = Parental negative attitude toward graduation; AFSC = Affect toward school; NPEER = Negative influence by peers; PPEER = Positive influence by peers; SURF = Surface learning; DEEP = Deep learning; HISC = High school expectations; UNIV = University expectations; JOB = Employment expectations; FAMI = Family expectations; SOCI = Society expectations.; λ = Standardized factor loading; δ = Uniqueness.

Table S3. *Goodness-of-Fit Results from the Latent Profile Analyses*

Model	LL	#fp	Scaling	AIC	CAIC	BIC	ABIC	Entropy	aLMR	BLRT
Australian (n=883)										
1 profile	-8804.260	16	1.0577	17640.520	17733.053	17717.053	17666.241	Na	Na	Na
2 profile	-8285.417	33	1.4289	16636.834	16827.684	16794.684	16689.882	0.737	0.0134	≤0.001
3 profile	-7931.224	50	1.2621	15962.449	16251.615	16201.615	16042.825	0.790	0.0019	≤0.001
4 profile	-7775.962	67	1.3065	15685.924	16073.406	16006.406	15793.628	0.786	0.1167	≤0.001
5 profile	-7633.359	84	1.3857	15434.719	15920.518	15836.518	15569.752	0.793	0.4138	≤0.001
6 profile	-7518.481	101	1.2425	15238.962	15823.077	15722.077	15401.323	0.807	0.1170	≤0.001
7 profile	-7457.563	118	1.2241	15151.126	15833.559	15715.559	15340.815	0.813	0.3475	≤0.001
8 profile	-7399.648	135	1.2288	15069.296	15850.045	15715.045	15286.313	0.825	0.5702	≤0.001
Indigenous Australian (n = 333)										
1 profile	-3526.388	16	0.9889	7084.777	7161.707	7145.707	7094.954	Na	Na	Na
2 profile	-3182.440	33	1.1073	6430.880	6589.549	6556.549	6451.871	0.874	≤0.001	≤0.001
3 profile	-3060.473	50	1.0763	6220.946	6461.353	6411.353	6252.749	0.869	0.0069	≤0.001
4 profile	-2956.721	67	1.0675	6047.442	6369.587	6302.587	6090.059	0.905	≤0.001	≤0.001
5 profile	-2867.441	84	1.2450	5902.882	6306.766	6222.766	5956.312	0.895	0.6503	≤0.001
6 profile	-2803.286	101	1.0275	5808.571	6294.194	6193.194	5872.815	0.908	0.0732	≤0.001
7 profile	-2748.489	118	1.0111	5732.977	6300.338	6182.338	5808.034	0.914	0.1127	≤0.001
8 profile	-2708.008	135	1.0510	5686.015	6335.115	6200.115	5771.886	0.908	0.1266	≤0.001
Indigenous American (n = 743)										
1 profile	-7459.297	16	1.0205	14950.594	15040.365	15024.365	15024.365	Na	Na	Na
2 profile	-6864.877	33	1.3176	13795.754	13980.907	13947.907	13843.120	0.790	≤0.001	≤0.001
3 profile	-6605.414	50	1.4408	13310.828	13591.363	13541.363	13382.595	0.796	0.1422	≤0.001
4 profile	-6395.771	67	1.2062	12925.541	13301.458	13234.458	13021.709	0.822	≤0.001	≤0.001
5 profile	-6292.569	84	1.2546	12753.138	13224.437	13140.437	12873.706	0.816	0.1687	≤0.001
6 profile	-6213.472	101	1.1950	12628.944	13195.624	13094.624	12773.912	0.820	0.0775	≤0.001
7 profile	-6140.995	118	1.2586	12517.991	13180.053	13062.053	12687.360	0.823	0.3245	≤0.001
8 profile	-6077.614	135	1.2424	12425.229	13182.673	13047.673	12618.998	0.836	0.4478	≤0.001
Middle East (n = 363)										
1 profile	-3923.425	16	1.0208	7878.850	7957.160	7941.160	7890.399	Na	Na	Na
2 profile	-3665.607	33	1.2314	7397.215	7558.730	7525.730	7421.036	0.800	0.0042	≤0.001
3 profile	-3485.692	50	1.2246	7071.383	7316.103	7266.103	7107.475	0.822	0.0160	≤0.001
4 profile	-3406.236	67	1.1666	6946.472	7274.397	7207.397	6994.835	0.846	0.0741	≤0.001
5 profile	-3332.228	84	1.2004	6832.456	7243.586	7159.586	6893.091	0.851	0.3017	≤0.001
6 profile	-3275.800	101	1.1734	6753.600	7247.935	7146.935	6826.507	0.863	0.4370	≤0.001
7 profile	-3236.598	118	1.1553	6709.196	7286.736	7168.736	6794.374	0.871	0.3962	≤0.001
8 profile	-3200.669	135	1.1359	6671.337	7332.082	7197.082	6768.786	0.875	0.4211	≤0.001

Model	LL	#fp	Scaling	AIC	CAIC	BIC	ABIC	Entropy	aLMR	BLRT
Asian (n=321)										
1 profile	-3238.580	16	1.0608	6509.160	6585.503	6569.503	6518.754	Na	Na	Na
2 profile	-3012.115	33	1.2216	6090.230	6247.688	6214.688	6110.017	0.824	≤0.001	≤0.001
3 profile	-2866.361	50	1.2374	5832.723	6071.295	6021.295	5862.703	0.828	0.0578	≤0.001
4 profile	-2804.927	67	1.1403	5743.854	6063.541	5996.541	5784.028	0.855	0.0266	≤0.001
5 profile	-2742.917	84	1.2084	5653.834	6054.636	5970.636	5704.201	0.836	0.4394	≤0.001
6 profile	-2700.532	101	1.1166	5603.063	6084.979	5983.979	5663.623	0.860	0.1875	≤0.001
7 profile	-2658.694	118	1.1051	5553.388	6116.419	5998.419	5624.141	0.881	0.5218	≤0.001
8 profile	-2621.195	135	1.0977	5512.391	6156.536	6021.536	5593.337	0.884	0.3081	≤0.001

Note. *: $p \leq .01$; LL: Model LogLikelihood; #fp: Number of free parameters; Scaling = scaling factor associated with MLR loglikelihood estimates; AIC: Akaïke Information Criteria; CAIC: Constant AIC; BIC: Bayesian Information Criteria; ABIC: Sample-Size adjusted BIC; aLMR: Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT: Bootstrap Likelihood ratio test; LRT: Likelihood Ratio Test; df: Degrees of freedom associated with the LRT; M: Means; V: Variances; P: Class probabilities.

Table S4

Detailed Results from the Final LPA Solution of Partial Distributional Similarity

	Profile 1		Profile 2		Profile 3		Profile 4	
Achievement Goal	Mean (CI)	Variance	Mean (CI)	Variance	Mean (CI)	Variance	Mean (CI)	Variance
Task involvement	0.485 (0.399; 0.572)	0.529	-0.037 (-0.239; 0.166)	0.451	-0.379 (-0.596; -0.162)	0.777	0.703 (0.454; 0.951)	0.480
Effort	0.659 (0.523; 0.795)	0.431	0.105 (-0.225; 0.434)	0.311	-0.841 (-1.15; -0.532)	0.947	1.192 (0.870; 1.515)	0.344
Competition	-0.350 (-0.534; -0.167)	0.630	0.595 (0.391; 0.799)	0.397	-0.828 (-1.066; -0.591)	0.678	1.072 (0.869; 1.275)	0.702
Social power	-0.569 (-0.755; -0.384)	0.493	0.679 (0.464; 0.893)	0.442	-0.926 (-1.21; -0.642)	0.772	1.031 (0.813; 1.248)	0.787
Affiliation	-0.023 (-0.147; 0.102)	0.756	0.314 (0.077; 0.551)	0.485	-0.675 (-0.804; -0.546)	0.772	0.770 (0.622; 0.918)	0.680
Social concern	0.663 (0.552; 0.774)	0.530	-0.234 (-0.431; -0.038)	0.449	-0.369(-0.69; -0.048)	0.940	0.605 (0.337; 0.872)	0.536
Praise	0.314 (0.110; 0.518)	0.496	0.342 (-0.009; 0.693)	0.198	-1.297 (-1.445; -1.148)	0.322	1.475 (1.165; 1.786)	0.265
Token rewards	-0.305 (-0.533; -0.078)	0.609	0.622(0.305; 0.939)	0.268	-1.208 (-1.424; -0.992)	0.581	1.347 (1.100; 1.595)	0.439
	Profile 5 Non-Indigenous Australians		Profile 5 Indigenous		Profile 5 Easterners			
	Mean (CI)	Variance	Mean (CI)	Variance	Mean (CI)	Variance		
Task involvement	-0.332 (-0.430; -0.235)	0.258	-0.461 (-0.575; -0.348)	0.370	-0.463 (-0.638; -0.288)	0.344	-	-
Effort	-0.644 (-0.755; -0.532)	0.193	-0.644 (-0.791; -0.498)	0.294	-0.506 (-0.735; -0.277)	0.237	-	-
Competition	-0.193 (-0.443; 0.058)	0.276	-0.384 (-0.508; -0.260)	0.216	0.118 (-0.126; 0.362)	0.188	-	-
Social power	-0.321 (-0.544; -0.098)	0.299	0.083 (-0.051; 0.216)	0.321	0.065 (-0.154; 0.283)	0.270	-	-
Affiliation	-0.161 (-0.291; -0.030)	0.391	-0.211 (-0.354; -0.068)	0.346	-0.347 (-0.514; -0.180)	0.194	-	-
Social concern	-0.031 (-0.171; 0.108)	0.346	-0.686 (-0.780; -0.592)	0.326	-0.326 (-0.454; -0.198)	0.250	-	-
Praise	-0.395 (-0.584; -0.205)	0.228	-0.562 (-0.715; -0.408)	0.188	-0.429 (-0.684; -0.175)	0.145	-	-
Token rewards	-0.434 (-0.664; -0.204)	0.247	-0.102 (-0.247; 0.043)	0.220	-0.059 (-0.26; 0.142)	0.205	-	-

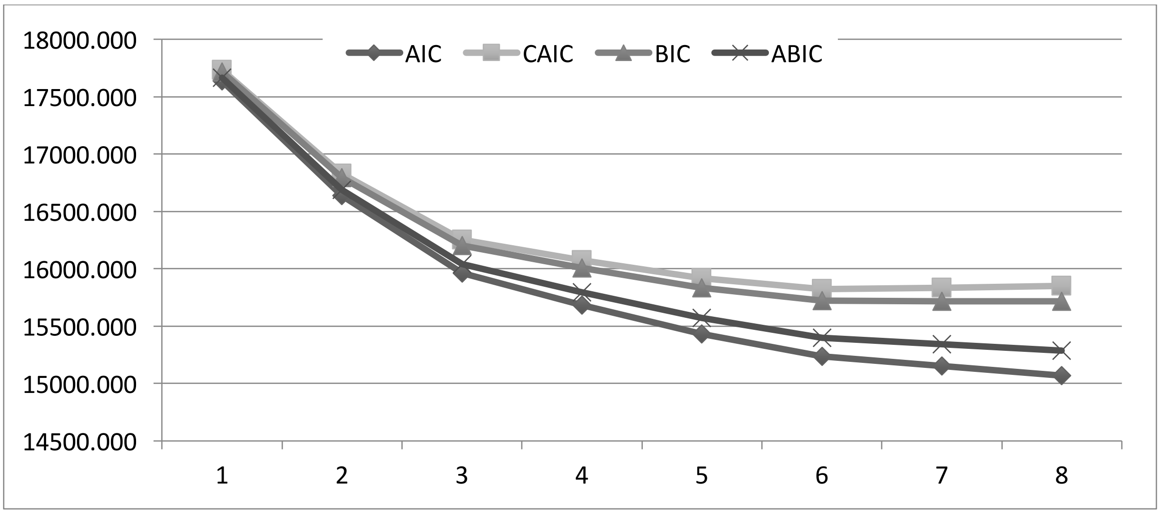

Figure S1. Elbow Plot of the Information Criteria for the Latent Profile Analyses (Non-Indigenous Australians).

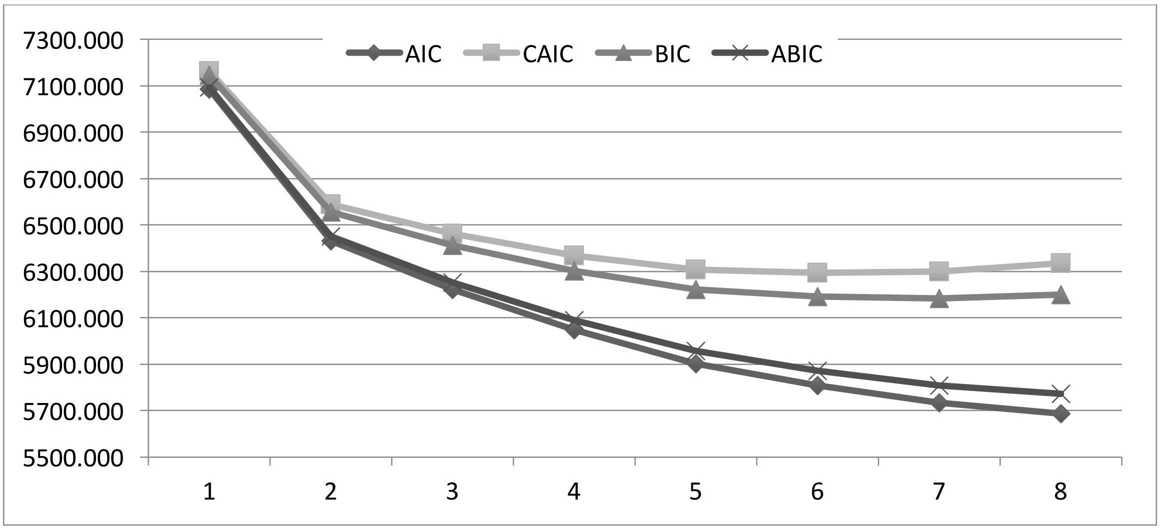

Figure S2. Elbow Plot of the Information Criteria for the Latent Profile Analyses (Indigenous Australians).

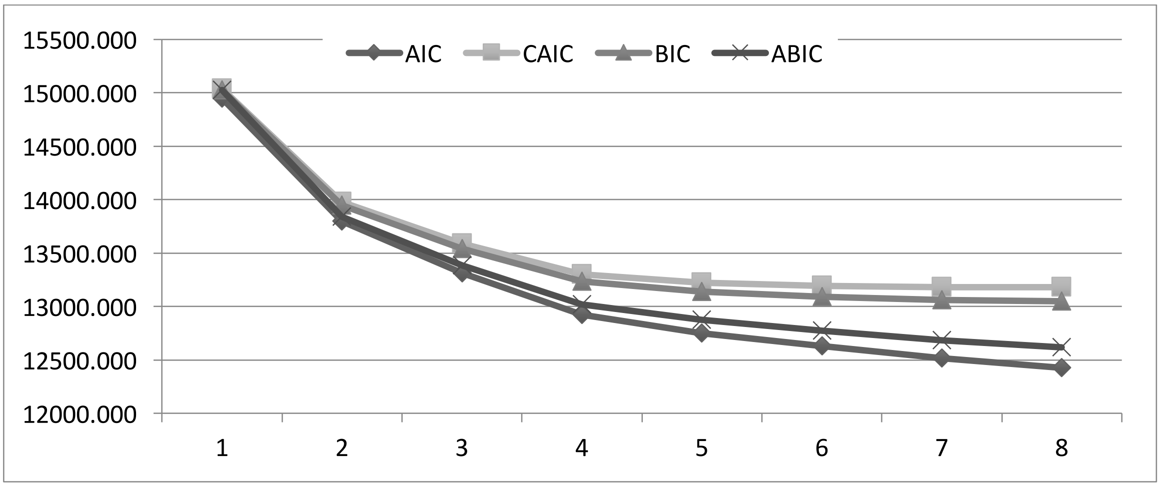

Figure S3. Elbow Plot of the Information Criteria for the Latent Profile Analyses (Indigenous Americans).

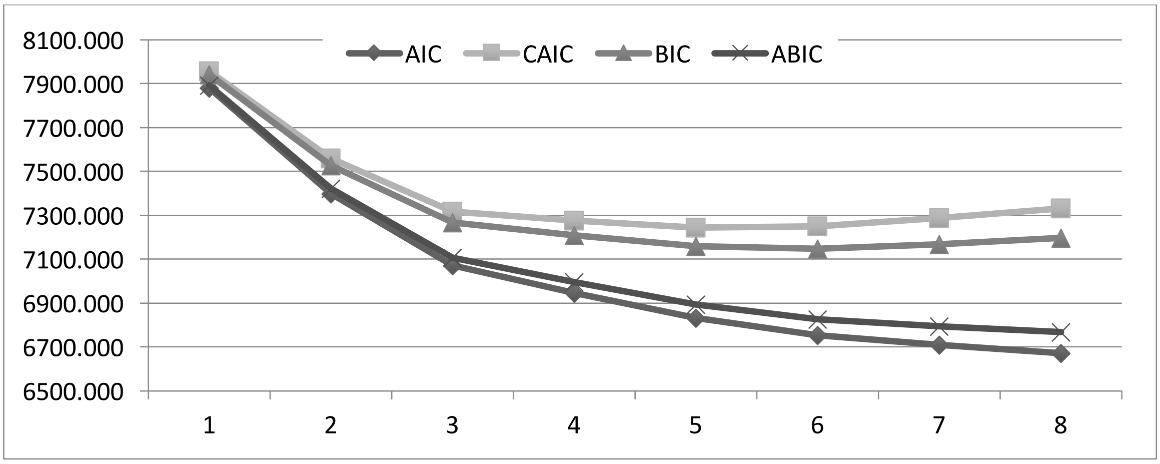

Figure S4. Elbow Plot of the Information Criteria for the Latent Profile Analyses (Middle Easterners).

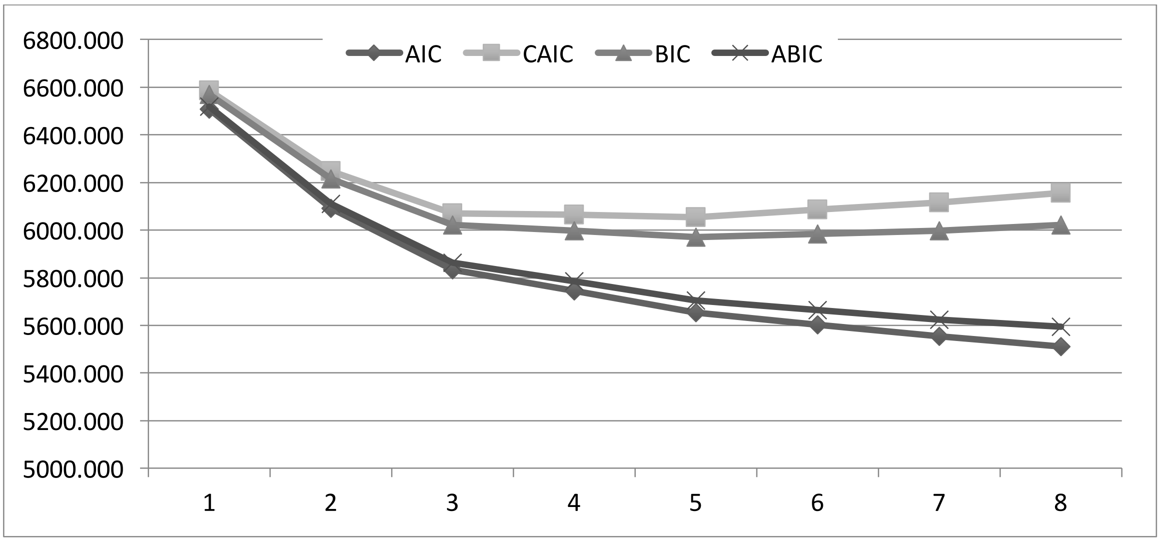

Figure S5. Elbow Plot of the Information Criteria for the Latent Profile Analyses (Asians).

Mplus Input to Estimate a 5-Class Latent Profile Analysis (Non-Indigenous Australians)

```
! In all input files, statements preceded by ! are annotations.
! Use the following statement to identify the data set. Here, the data set is labelled FSCORES
    IC.dat.
DATA:
FILE IS FSCORES IC.dat;
! The variables names function identifies all variables in the data set, in order of appearance,
! whereas the usevariable command identifies the variables used in the analysis.
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
! The following identifies the code for missing data
MISSING are all *;
! The following identifies the unique identifier for participants
IDVARIABLE = ID1;
! The following identifies the subsample from which the participants are taken. In this case,
the Non-
! Indigenous Australian subsample.
USEOBSERVATIONS is (t1et eq 1);
! The following identifies the number of latent profiles requested in the analysis.
CLASSES = c (5);
TYPE = MIXTURE ;
ESTIMATOR = MLR;
! The following set up is to estimate the model using 5000 starts values, 200 final stage
optimizations, and 100 iterations.
STARTS = 5000 200;
STITERATIONS = 100;
! In this input, the overall model statement defines sections that are common across profiles.
! Here, there is no need to include anything in this section.
! The %c#1% to %c#5% sections are class-specific statement to specify which part of the
! model is freely estimated in each profile.
! For a simple latent profile model, include the means of the indicators (using []) in all
profiles.
! To also freely estimate all variances, add the following in each class-specific statement:
! TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MODEL:
%OVERALL%
%c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN];
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
%c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN];
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
%c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN];
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
%c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN];
```

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
%c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN];
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
! Specific sections of output are requested. TECH11 estimates LMR, and TECH14 estimates BLRT.
OUTPUT:  STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Configural Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined
DATA: FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *; IDVARIABLE = ID1;
! The following command is used to define a new grouping variable and its level. Here, the
label used ! is cg and the number 1 to 5 represent each of the five cultural groups.
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
! The mixture model will now consider that there are five latent grouping variables (cg(5)),
! with 5 profiles (c (5)).
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE ; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
! The %OVERALL% section of the model section is used to indicate that the class sizes are
freely
! estimated in all observed samples (cultural groups) using the ON function
! (reflecting regressions) indicating that profile membership is conditional on gender. Only k-
1
! statements are required (i.e., 4 for a 5-profile model). Then, profile-specific statements now
need to
! be defined using a combination of both the known classes CG and the estimated classes C.
! Labels in parentheses identify parameters that are estimated to be equal across groups.
! Here, even though all parameters are labeled, none of these labels are share between
groups,
! so that the means and variances are freely estimated in all combinations of profiles and
gender.
! Lists of constraints (e.g., maus1-maus8) apply to the parameters in order of appearance
! (e.g., maus1 applies to TASK, maus2 to EFFO, maus3 to COMP and so on).
Model:
%OVERALL%
c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
c#1 on cg#2; c#2 on cg#2; c#3 on cg#2; c#4 on cg#2;
c#1 on cg#3; c#2 on cg#3; c#3 on cg#3; c#4 on cg#3;
c#1 on cg#4; c#2 on cg#4; c#3 on cg#4; c#4 on cg#4;
%cg#1.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#1.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#1.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
```

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus1-midaus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus1-vidaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus9-midaus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus9-vidaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus17-midaus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus17-vidaus24);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus25-midaus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus25-vidaus32);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midam1-midam8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam1-vidam8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midam9-midam16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam9-vidam16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midam17-midam24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam17-vidam24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midam25-midam32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam25-vidam32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midam33-midam40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam33-vidam40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd1-mmidd8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd1-vmidd8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd9-mmidd16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd9-vmidd16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd17-mmidd24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd17-vmidd24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd25-mmidd32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd25-vmidd32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
```

```
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](masia1-masia8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia1-vasia8);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](masia9-masia16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia9-vasia16);
%cg#5.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](masia17-masia24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia17-vasia24);
%cg#5.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](masia25-masia32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia25-vasia32);
%cg#5.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](masia33-masia40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia33-vasia40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Structural Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);  CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
MODEL:
%OVERALL%
c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
c#1 on cg#2; c#2 on cg#2; c#3 on cg#2; c#4 on cg#2;
c#1 on cg#3; c#2 on cg#3; c#3 on cg#3; c#4 on cg#3;
c#1 on cg#4; c#2 on cg#4; c#3 on cg#4; c#4 on cg#4;
! Labels in bold indicate newly imposed invariance constraints on means across cultural
groups.
%cg#1.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#1.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#1.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus1-vidaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus9-vidaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus17-vidaus24);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus25-vidaus32);
%cg#2.c#5%
```

[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus33-maus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus1-maus8**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam1-vidam8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus9-maus16**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam9-vidam16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus17-maus24**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam17-vidam24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus25-maus32**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam25-vidam32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus33-maus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam33-vidam40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus1-maus8**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd1-vmidd8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus9-maus16**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd9-vmidd16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus17-maus24**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd17-vmidd24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus25-maus32**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd25-vmidd32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus33-maus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus1-maus8**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia1-vasia8);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus9-maus16**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia9-vasia16);
%cg#5.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus17-maus24**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia17-vasia24);
%cg#5.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus25-maus32**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia25-vasia32);
%cg#5.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**maus33-maus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia33-vasia40);
OUTPUT: STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;

Mplus Input to Estimate a Partial Structural Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *;IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
MODEL:
%OVERALL%
c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
c#1 on cg#2; c#2 on cg#2; c#3 on cg#2; c#4 on cg#2;
c#1 on cg#3; c#2 on cg#3; c#3 on cg#3; c#4 on cg#3;
c#1 on cg#4; c#2 on cg#4; c#3 on cg#4; c#4 on cg#4;
! Labels in bold indicate newly imposed invariance constraints on means for fifth profile
(c#5)
! between Indigenous Australians (cg#2) and Indigenous Americans (cg#3), and between
! Middle Easterners (cg#4)  and Asians (cg#5).
%cg#1.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#1.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#1.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus1-vidaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus9-vidaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus17-vidaus24);
```

%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus25-vidaus32);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**midaus33-midaus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam1-vidam8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam9-vidam16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam17-vidam24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam25-vidam32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**midaus33-midaus40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidam33-vidam40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd1-vmidd8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd9-vmidd16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd17-vmidd24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd25-vmidd32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**mmidd33-mmidd40**);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia1-vasia8);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia9-vasia16);
%cg#5.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia17-vasia24);
%cg#5.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia25-vasia32);
%cg#5.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](**mmidd33-mmidd40**);

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vasia33-vasia40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Dispersion Similarity Model for a Latent Profile Analysis

! Annotations only focus on functions not previously defined.
! This model builds from the model of partial structural invariance.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS = 1000;
MODEL:
%OVERALL%
c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
c#1 on cg#2; c#2 on cg#2; c#3 on cg#2; c#4 on cg#2;
c#1 on cg#3; c#2 on cg#3; c#3 on cg#3; c#4 on cg#3;
c#1 on cg#4; c#2 on cg#4; c#3 on cg#4; c#4 on cg#4;
! Labels in bold indicate newly imposed invariance constraints on variances across cultural groups.
! In line with the means of the partial structural invariance model, we constrained the variance
! for fifth profile (c#5) between Indigenous Australians (cg#2) and Indigenous Americans (cg#3),
! and between Middle Easterners (cg#4) and Asians (cg#5).
%cg#1.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#1.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#1.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus33-vaus40**);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus1-vaus8**);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus9-vaus16**);

%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus17-vaus24**);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus25-vaus32**);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vidaus33-vidaus40**);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus1-vaus8**);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus9-vaus16**);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus17-vaus24**);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus25-vaus32**);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vidaus33-vidaus40**);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus1-vaus8**);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus9-vaus16**);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus17-vaus24**);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus25-vaus32**);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vmidd33-vmidd40**);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus1-vaus8**);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus9-vaus16**);
%cg#5.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(**vaus17-vaus24**);
%cg#5.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#5.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Distribution Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
! The only difference between this model and the model of dispersion invariance one is that
      nothing
! appears in the %OVERALL% section of the input to reflect the fact that the sizes of the
      profiles
! are no longer conditional on cultural group.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
MODEL:
%OVERALL%
%cg#1.c#1%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
 %cg#1.c#2%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
 %cg#1.c#3%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
 %cg#1.c#4%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
 %cg#1.c#5%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
 %cg#2.c#1%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
 %cg#2.c#2%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
 %cg#2.c#3%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
 %cg#2.c#4%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
 %cg#2.c#5%
```

```
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
  %cg#3.c#1%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#3.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#3.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#3.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#3.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
  %cg#4.c#1%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#4.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#4.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#4.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#4.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
  %cg#5.c#1%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#5.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#5.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#5.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#5.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Partial Distribution Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN;
MISSING are all *;  IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
MODEL:
%OVERALL%
! Labels in bold indicate newly imposed invariance constraints on the relative size of the
profiles
! across cultural groups.
! In line with the previous grouping patterns of partial structural invariance and dispersion
model,
! we constrained the relative size of the profiles to be invariant between Indigenous
Australians
! (cg#2) and Indigenous Americans (cg#3), and between Middle Easterners (cg#4) and
Asians (cg#5).
! The constraints between the two first groups were added using through labels in bold
! The constraints between the two last groups were added by fixing the regression to 0 in the
fourth
! group (Middle Easterners), as it is done by default with the fifth group (Asians) .
   c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
   c#1 on cg#2 (p1); c#2 on cg#2 (p2); c#3 on cg#2 (p3); c#4 on cg#2 (p4);
   c#1 on cg#3 (p1); c#2 on cg#3 (p2); c#3 on cg#3 (p3); c#4 on cg#3 (p4);
   c#1-c#4 on cg#4@0;
%cg#1.c#1%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#1.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#1.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#1.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#1.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
```

```
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
```

```
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#5.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#5.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#5.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Latent Profile Analysis with Predictors Freely Estimated Across Cultural Groups.

```
! Annotations only focus on functions not previously defined.
! This model builds from the model of partial distribution invariance.
! To ensure stability, starts values from the previously most invariant solution should be used.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
! Predictors were added in the following statement.
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
! To ensure that the latent profile solution remains unchanged by the inclusion of predictors,
        starts
! values from the final retained model without covariates (predictors/outcomes) can be used
        and the
! random starts fixed to 0. STARTS = 0;
MODEL:
%OVERALL%
   c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
   c#1 on cg#2 (p1); c#2 on cg#2 (p2); c#3 on cg#2 (p3); c#4 on cg#2 (p4);
   c#1 on cg#3 (p1); c#2 on cg#3 (p2); c#3 on cg#3 (p3); c#4 on cg#3 (p4);
   c#1-c#4 on cg#4@0;
! The following command was added to include the effect of covariates on profile
        memberships.
! To allow these effects to be freely estimated across culture, they need to be
! constrained to 0 in the %OVERALL% section, and freely estimated in each cultural groups
        in a new
! section of the input specifically referring to CG. See all sections in bold.
c#1-c#4 ON SVLUE@0 PSPP@0 STUPP@0 LSCHL@0 AFSCH@0 NPEER@0
PPEER@0;
%cg#1.c#1%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#1.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#1.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#1.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
```

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
```

```
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
  %cg#5.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#5.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#5.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#5.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
MODEL cg:
%cg#1%
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
%cg#2%
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
%cg#3%
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
%cg#4%
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
%cg#5%
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Predictive Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
! This model is almost identical to the previous one.
! In order for the effects of the predictors to be constrained to invariance across cultural
        groups, they
! simply need to be specified as freely estimated in the %OVERALL% section by adding the
        following
! command. The section added in the previous model which was specific to the cultural
        groups must
! also be removed.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
! To ensure that the latent profile solution remains unchanged by the inclusion of predictors,
        starts
! values from the final retained model without covariates (predictors/outcomes) can be used
        and the
! random starts fixed to 0. STARTS = 0;
MODEL:
%OVERALL%
  c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
  c#1 on cg#2 (p1); c#2 on cg#2 (p2); c#3 on cg#2 (p3); c#4 on cg#2 (p4);
  c#1 on cg#3 (p1); c#2 on cg#3 (p2); c#3 on cg#3 (p3); c#4 on cg#3 (p4);
  c#1-c#4 on cg#4@0;
c#1-c#4 ON SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER;
%cg#1.c#1%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
 %cg#1.c#2%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
 %cg#1.c#3%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
 %cg#1.c#4%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
 %cg#1.c#5%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
```

```
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
%cg#5.c#2%
```

```
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
  %cg#5.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
  %cg#5.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
  %cg#5.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
OUTPUT:   STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;
```

Mplus Input to Estimate a Latent Profile Analysis with Outcomes Levels Freely Estimated Across Cultural Groups

! Annotations only focus on functions not previously defined.
! This model builds from the model of partial distribution invariance.
! To ensure stability, starts values from the previously most invariant solution (partial distribution invariance) should be used.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB FAMILY SOCIETY;
! Outcomes were added in the following command.
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN SURFSTRA DEEPSTRA HIGHSC UNIVER JOB FAMILY SOCIETY;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS = 1000;
! To ensure that the latent profile solution remains unchanged by the inclusion of predictors, starts
! values from the final retained model without covariates (predictors/outcomes) can be used and the
! random starts fixed to 0. STARTS = 0;
MODEL:
%OVERALL%
c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
c#1 on cg#2 (p1); c#2 on cg#2 (p2); c#3 on cg#2 (p3); c#4 on cg#2 (p4);
c#1 on cg#3 (p1); c#2 on cg#3 (p2); c#3 on cg#3 (p3); c#4 on cg#3 (p4);
c#1-c#4 on cg#4@0;
! The following statements are added to request the free estimation of the distal outcome means in all profiles for each cultural group. We also use labels in parentheses to identify these new parameters, which will then be used in a new MODEL CONSTRAINT section to request tests of the significance of mean differences between profiles and cultural groups. See all sections in bold.
%cg#1.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d); [JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
%cg#1.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d); [JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
%cg#1.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);

[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d); [JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d); [JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d); [JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](idau1a); [DEEPSTRA](idau1b); [HIGHSC](idau1c); [UNIVER](idau1d); [JOB](idau1e); [FAMILY](idau1f); [SOCIETY](idau1g);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](idau2a); [DEEPSTRA](idau2b); [HIGHSC](idau2c); [UNIVER](idau2d); [JOB](idau2e); [FAMILY](idau2f); [SOCIETY](idau2g);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](idau3a); [DEEPSTRA](idau3b); [HIGHSC](idau3c); [UNIVER](idau3d); [JOB](idau3e); [FAMILY](idau3f); [SOCIETY](idau3g);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](idau4a); [DEEPSTRA](idau4b); [HIGHSC](idau4c); [UNIVER](idau4d); [JOB](idau4e); [FAMILY](idau4f); [SOCIETY](idau4g);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
[SURFSTRA](idau5a); [DEEPSTRA](idau5b); [HIGHSC](idau5c); [UNIVER](idau5d); [JOB](idau5e); [FAMILY](idau5f); [SOCIETY](idau5g);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](idam1a); [DEEPSTRA](idam1b); [HIGHSC](idam1c); [UNIVER](idam1d);
[JOB](idam1e); [FAMILY](idam1f); [SOCIETY](idam1g);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](idam2a); [DEEPSTRA](idam2b); [HIGHSC](idam2c); [UNIVER](idam2d);
[JOB](idam2e); [FAMILY](idam2f); [SOCIETY](idam2g);
%cg#3.c#3%

[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](idam3a); [DEEPSTRA](idam3b); [HIGHSC](idam3c); [UNIVER](idam3d);
[JOB](idam3e); [FAMILY](idam3f); [SOCIETY](idam3g);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](idam4a); [DEEPSTRA](idam4b); [HIGHSC](idam4c); [UNIVER](idam4d);
[JOB](idam4e); [FAMILY](idam4f); [SOCIETY](idam4g);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
[SURFSTRA](idam5a); [DEEPSTRA](idam5b); [HIGHSC](idam5c); [UNIVER](idam5d);
[JOB](idam5e); [FAMILY](idam5f); [SOCIETY](idam5g);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](midd1a); [DEEPSTRA](midd1b); [HIGHSC](midd1c); [UNIVER](midd1d);
[JOB](midd1e); [FAMILY](midd1f); [SOCIETY](midd1g);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](midd2a); [DEEPSTRA](midd2b); [HIGHSC](midd2c); [UNIVER](midd2d);
[JOB](midd2e); [FAMILY](midd2f); [SOCIETY](midd2g);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](midd3a); [DEEPSTRA](midd3b); [HIGHSC](midd3c); [UNIVER](midd3d);
[JOB](midd3e); [FAMILY](midd3f); [SOCIETY](midd3g);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](midd4a); [DEEPSTRA](midd4b); [HIGHSC](midd4c); [UNIVER](midd4d);
[JOB](midd4e); [FAMILY](midd4f); [SOCIETY](midd4g);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
[SURFSTRA](midd5a); [DEEPSTRA](midd5b); [HIGHSC](midd5c); [UNIVER](midd5d);
[JOB](midd5e); [FAMILY](midd5f); [SOCIETY](midd5g);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);

```
[SURFSTRA](asia1a); [DEEPSTRA](asia1b); [HIGHSC](asia1c); [UNIVER](asia1d);
[JOB](asia1e); [FAMILY](asia1f); [SOCIETY](asia1g);
  %cg#5.c#2%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](asia2a); [DEEPSTRA](asia2b); [HIGHSC](asia2c); [UNIVER](asia2d);
[JOB](asia2e); [FAMILY](asia2f); [SOCIETY](asia2g);
  %cg#5.c#3%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](asia3a); [DEEPSTRA](asia3b); [HIGHSC](asia3c); [UNIVER](asia3d);
[JOB](asia3e); [FAMILY](asia3f); [SOCIETY](asia3g);
  %cg#5.c#4%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](asia4a); [DEEPSTRA](asia4b); [HIGHSC](asia4c); [UNIVER](asia4d);
[JOB](asia4e); [FAMILY](asia4f); [SOCIETY](asia4g);
  %cg#5.c#5%
  [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
  TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
[SURFSTRA](asia5a); [DEEPSTRA](asia5b); [HIGHSC](asia5c); [UNIVER](asia5d);
[JOB](asia5e); [FAMILY](asia5f); [SOCIETY](asia5g);
MODEL CONSTRAINT:
! New parameters are created using this function and reflect pairwise mean differences between
! profiles. So the first of those (ya12a) reflect the differences between the means of profiles 1 and 2 in ! the Australian subsample.
! This will be included in the outputs as new parameters reflecting the significance of
! the differences between the means, without those parameters having an impact on the model.
! Please note that these constraints were irrelevant in this study, as the distal outcomes means were
! invariant across cultural groups. We chose to present them as an example for further research.
! In the chosen labels:
! y = Intragroup comparison (between profiles)
! a to e (second parameter) = cultural groups
! 12 = comparison between profiles 1 and 2
! a to g (fifth parameter) = outcome identification.
!!!!!!!!!!!!!!!!!!!
!!Non-Indigenous Australians!!
!!!!!!!!!!!!!!!!!!!
NEW (ya12a);
ya12a = aus1a-aus2a;
NEW (ya13a);
ya13a = aus1a-aus3a;
NEW (ya14a);
ya14a = aus1a-aus4a;
NEW (ya15a);
ya15a = aus1a-aus5a;
```

```
NEW (ya23a);
ya23a = aus2a-aus3a;
NEW (ya24a);
ya24a = aus2a-aus4a;
NEW (ya25a);
ya25a = aus2a-aus5a;
NEW (ya34a);
ya34a = aus3a-aus4a;
NEW (ya35a);
ya35a = aus3a-aus5a;
NEW (ya45a);
ya45a = aus4a-aus5a;
NEW (ya12b);
ya12b = aus1b-aus2b;
NEW (ya13b);
ya13b = aus1b-aus3b;
NEW (ya14b);
ya14b = aus1b-aus4b;
NEW (ya15b);
ya15b = aus1b-aus5b;
NEW (ya23b);
ya23b = aus2b-aus3b;
NEW (ya24b);
ya24b = aus2b-aus4b;
NEW (ya25b);
ya25b = aus2b-aus5b;
NEW (ya34b);
ya34b = aus3b-aus4b;
NEW (ya35b);
ya35b = aus3b-aus5b;
NEW (ya45b);
ya45b = aus4b-aus5b;
NEW (ya12c);
ya12c = aus1c-aus2c;
NEW (ya13c);
ya13c = aus1c-aus3c;
NEW (ya14c);
ya14c = aus1c-aus4c;
NEW (ya15c);
ya15c = aus1c-aus5c;
NEW (ya23c);
ya23c = aus2c-aus3c;
NEW (ya24c);
ya24c = aus2c-aus4c;
NEW (ya25c);
ya25c = aus2c-aus5c;
NEW (ya34c);
ya34c = aus3c-aus4c;
NEW (ya35c);
ya35c = aus3c-aus5c;
```

```
NEW (ya45c);
ya45c = aus4c-aus5c;
NEW (ya12d);
ya12d = aus1d-aus2d;
NEW (ya13d);
ya13d = aus1d-aus3d;
NEW (ya14d);
ya14d = aus1d-aus4d;
NEW (ya15d);
ya15d = aus1d-aus5d;
NEW (ya23d);
ya23d = aus2d-aus3d;
NEW (ya24d);
ya24d = aus2d-aus4d;
NEW (ya25d);
ya25d = aus2d-aus5d;
NEW (ya34d);
ya34d = aus3d-aus4d;
NEW (ya35d);
ya35d = aus3d-aus5d;
NEW (ya45d);
ya45d = aus4d-aus5d;
NEW (ya12e);
ya12e = aus1e-aus2e;
NEW (ya13e);
ya13e = aus1e-aus3e;
NEW (ya14e);
ya14e = aus1e-aus4e;
NEW (ya15e);
ya15e = aus1e-aus5e;
NEW (ya23e);
ya23e = aus2e-aus3e;
NEW (ya24e);
ya24e = aus2e-aus4e;
NEW (ya25e);
ya25e = aus2e-aus5e;
NEW (ya34e);
ya34e = aus3e-aus4e;
NEW (ya35e);
ya35e = aus3e-aus5e;
NEW (ya45e);
ya45e = aus4e-aus5e;
NEW (ya12f);
ya12f = aus1f-aus2f;
NEW (ya13f);
ya13f = aus1f-aus3f;
NEW (ya14f);
ya14f = aus1f-aus4f;
NEW (ya15f);
ya15f = aus1f-aus5f;
```

```
NEW (ya23f);
ya23f = aus2f-aus3f;
NEW (ya24f);
ya24f = aus2f-aus4f;
NEW (ya25f);
ya25f = aus2f-aus5f;
NEW (ya34f);
ya34f = aus3f-aus4f;
NEW (ya35f);
ya35f = aus3f-aus5f;
NEW (ya45f);
ya45f = aus4f-aus5f;
NEW (ya12g);
ya12g = aus1g-aus2g;
NEW (ya13g);
ya13g = aus1g-aus3g;
NEW (ya14g);
ya14g = aus1g-aus4g;
NEW (ya15g);
ya15g = aus1g-aus5g;
NEW (ya23g);
ya23g = aus2g-aus3g;
NEW (ya24g);
ya24g = aus2g-aus4g;
NEW (ya25g);
ya25g = aus2g-aus5g;
NEW (ya34g);
ya34g = aus3g-aus4g;
NEW (ya35g);
ya35g = aus3g-aus5g;
NEW (ya45g);
ya45g = aus4g-aus5g;
!!!!!!!!!!!!!!!!!!
!!! Ind. Aus. !!!
!!!!!!!!!!!!!!!!!!
NEW (yb12a);
yb12a = idau1a-idau2a;
NEW (yb13a);
yb13a = idau1a-idau3a;
NEW (yb14a);
yb14a = idau1a-idau4a;
NEW (yb15a);
yb15a = idau1a-idau5a;
NEW (yb23a);
yb23a = idau2a-idau3a;
NEW (yb24a);
yb24a = idau2a-idau4a;
NEW (yb25a);
yb25a = idau2a-idau5a;
NEW (yb34a);
```

```
yb34a = idau3a-idau4a;
NEW (yb35a);
yb35a = idau3a-idau5a;
NEW (yb45a);
yb45a = idau4a-idau5a;
NEW (yb12b);
yb12b = idau1b-idau2b;
NEW (yb13b);
yb13b = idau1b-idau3b;
NEW (yb14b);
yb14b = idau1b-idau4b;
NEW (yb15b);
yb15b = idau1b-idau5b;
NEW (yb23b);
yb23b = idau2b-idau3b;
NEW (yb24b);
yb24b = idau2b-idau4b;
NEW (yb25b);
yb25b = idau2b-idau5b;
NEW (yb34b);
yb34b = idau3b-idau4b;
NEW (yb35b);
yb35b = idau3b-idau5b;
NEW (yb45b);
yb45b = idau4b-idau5b;
NEW (yb12c);
yb12c = idau1c-idau2c;
NEW (yb13c);
yb13c = idau1c-idau3c;
NEW (yb14c);
yb14c = idau1c-idau4c;
NEW (yb15c);
yb15c = idau1c-idau5c;
NEW (yb23c);
yb23c = idau2c-idau3c;
NEW (yb24c);
yb24c = idau2c-idau4c;
NEW (yb25c);
yb25c = idau2c-idau5c;
NEW (yb34c);
yb34c = idau3c-idau4c;
NEW (yb35c);
yb35c = idau3c-idau5c;
NEW (yb45c);
yb45c = idau4c-idau5c;
NEW (yb12d);
yb12d = idau1d-idau2d;
NEW (yb13d);
yb13d = idau1d-idau3d;
NEW (yb14d);
```

```
yb14d = idau1d-idau4d;
NEW (yb15d);
yb15d = idau1d-idau5d;
NEW (yb23d);
yb23d = idau2d-idau3d;
NEW (yb24d);
yb24d = idau2d-idau4d;
NEW (yb25d);
yb25d = idau2d-idau5d;
NEW (yb34d);
yb34d = idau3d-idau4d;
NEW (yb35d);
yb35d = idau3d-idau5d;
NEW (yb45d);
yb45d = idau4d-idau5d;
NEW (yb12e);
yb12e = idau1e-idau2e;
NEW (yb13e);
yb13e = idau1e-idau3e;
NEW (yb14e);
yb14e = idau1e-idau4e;
NEW (yb15e);
yb15e = idau1e-idau5e;
NEW (yb23e);
yb23e = idau2e-idau3e;
NEW (yb24e);
yb24e = idau2e-idau4e;
NEW (yb25e);
yb25e = idau2e-idau5e;
NEW (yb34e);
yb34e = idau3e-idau4e;
NEW (yb35e);
yb35e = idau3e-idau5e;
NEW (yb45e);
yb45e = idau4e-idau5e;
NEW (yb12f);
yb12f = idau1f-idau2f;
NEW (yb13f);
yb13f = idau1f-idau3f;
NEW (yb14f);
yb14f = idau1f-idau4f;
NEW (yb15f);
yb15f = idau1f-idau5f;
NEW (yb23f);
yb23f = idau2f-idau3f;
NEW (yb24f);
yb24f = idau2f-idau4f;
NEW (yb25f);
yb25f = idau2f-idau5f;
NEW (yb34f);
```

```
yb34f = idau3f-idau4f;
NEW (yb35f);
yb35f = idau3f-idau5f;
NEW (yb45f);
yb45f = idau4f-idau5f;
NEW (yb12g);
yb12g = idau1g-idau2g;
NEW (yb13g);
yb13g = idau1g-idau3g;
NEW (yb14g);
yb14g = idau1g-idau4g;
NEW (yb15g);
yb15g = idau1g-idau5g;
NEW (yb23g);
yb23g = idau2g-idau3g;
NEW (yb24g);
yb24g = idau2g-idau4g;
NEW (yb25g);
yb25g = idau2g-idau5g;
NEW (yb34g);
yb34g = idau3g-idau4g;
NEW (yb35g);
yb35g = idau3g-idau5g;
NEW (yb45g);
yb45g = idau4g-idau5g;
!!!!!!!!!!!!!!!!!!!!
!!! Ind. Amer. !!
!!!!!!!!!!!!!!!!!!!!
NEW (yc12a);
yc12a = idam1a-idam2a;
NEW (yc13a);
yc13a = idam1a-idam3a;
NEW (yc14a);
yc14a = idam1a-idam4a;
NEW (yc15a);
yc15a = idam1a-idam5a;
NEW (yc23a);
yc23a = idam2a-idam3a;
NEW (yc24a);
yc24a = idam2a-idam4a;
NEW (yc25a);
yc25a = idam2a-idam5a;
NEW (yc34a);
yc34a = idam3a-idam4a;
NEW (yc35a);
yc35a = idam3a-idam5a;
NEW (yc45a);
yc45a = idam4a-idam5a;
NEW (yc12b);
yc12b = idam1b-idam2b;
```

```
NEW (yc13b);
yc13b = idam1b-idam3b;
NEW (yc14b);
yc14b = idam1b-idam4b;
NEW (yc15b);
yc15b = idam1b-idam5b;
NEW (yc23b);
yc23b = idam2b-idam3b;
NEW (yc24b);
yc24b = idam2b-idam4b;
NEW (yc25b);
yc25b = idam2b-idam5b;
NEW (yc34b);
yc34b = idam3b-idam4b;
NEW (yc35b);
yc35b = idam3b-idam5b;
NEW (yc45b);
yc45b = idam4b-idam5b;
NEW (yc12c);
yc12c = idam1c-idam2c;
NEW (yc13c);
yc13c = idam1c-idam3c;
NEW (yc14c);
yc14c = idam1c-idam4c;
NEW (yc15c);
yc15c = idam1c-idam5c;
NEW (yc23c);
yc23c = idam2c-idam3c;
NEW (yc24c);
yc24c = idam2c-idam4c;
NEW (yc25c);
yc25c = idam2c-idam5c;
NEW (yc34c);
yc34c = idam3c-idam4c;
NEW (yc35c);
yc35c = idam3c-idam5c;
NEW (yc45c);
yc45c = idam4c-idam5c;
NEW (yc12d);
yc12d = idam1d-idam2d;
NEW (yc13d);
yc13d = idam1d-idam3d;
NEW (yc14d);
yc14d = idam1d-idam4d;
NEW (yc15d);
yc15d = idam1d-idam5d;
NEW (yc23d);
yc23d = idam2d-idam3d;
NEW (yc24d);
yc24d = idam2d-idam4d;
```

```
NEW (yc25d);
yc25d = idam2d-idam5d;
NEW (yc34d);
yc34d = idam3d-idam4d;
NEW (yc35d);
yc35d = idam3d-idam5d;
NEW (yc45d);
yc45d = idam4d-idam5d;
NEW (yc12e);
yc12e = idam1e-idam2e;
NEW (yc13e);
yc13e = idam1e-idam3e;
NEW (yc14e);
yc14e = idam1e-idam4e;
NEW (yc15e);
yc15e = idam1e-idam5e;
NEW (yc23e);
yc23e = idam2e-idam3e;
NEW (yc24e);
yc24e = idam2e-idam4e;
NEW (yc25e);
yc25e = idam2e-idam5e;
NEW (yc34e);
yc34e = idam3e-idam4e;
NEW (yc35e);
yc35e = idam3e-idam5e;
NEW (yc45e);
yc45e = idam4e-idam5e;
NEW (yc12f);
yc12f = idam1f-idam2f;
NEW (yc13f);
yc13f = idam1f-idam3f;
NEW (yc14f);
yc14f = idam1f-idam4f;
NEW (yc15f);
yc15f = idam1f-idam5f;
NEW (yc23f);
yc23f = idam2f-idam3f;
NEW (yc24f);
yc24f = idam2f-idam4f;
NEW (yc25f);
yc25f = idam2f-idam5f;
NEW (yc34f);
yc34f = idam3f-idam4f;
NEW (yc35f);
yc35f = idam3f-idam5f;
NEW (yc45f);
yc45f = idam4f-idam5f;
NEW (yc12g);
yc12g = idam1g-idam2g;
```

```
NEW (yc13g);
yc13g = idam1g-idam3g;
NEW (yc14g);
yc14g = idam1g-idam4g;
NEW (yc15g);
yc15g = idam1g-idam5g;
NEW (yc23g);
yc23g = idam2g-idam3g;
NEW (yc24g);
yc24g = idam2g-idam4g;
NEW (yc25g);
yc25g = idam2g-idam5g;
NEW (yc34g);
yc34g = idam3g-idam4g;
NEW (yc35g);
yc35g = idam3g-idam5g;
NEW (yc45g);
yc45g = idam4g-idam5g;
!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!Middle Easterners !!
!!!!!!!!!!!!!!!!!!!!!!!!!!!
NEW (yd12a);
yd12a = midd1a-midd2a;
NEW (yd13a);
yd13a = midd1a-midd3a;
NEW (yd14a);
yd14a = midd1a-midd4a;
NEW (yd15a);
yd15a = midd1a-midd5a;
NEW (yd23a);
yd23a = midd2a-midd3a;
NEW (yd24a);
yd24a = midd2a-midd4a;
NEW (yd25a);
yd25a = midd2a-midd5a;
NEW (yd34a);
yd34a = midd3a-midd4a;
NEW (yd35a);
yd35a = midd3a-midd5a;
NEW (yd45a);
yd45a = midd4a-midd5a;
NEW (yd12b);
yd12b = midd1b-midd2b;
NEW (yd13b);
yd13b = midd1b-midd3b;
NEW (yd14b);
yd14b = midd1b-midd4b;
NEW (yd15b);
yd15b = midd1b-midd5b;
NEW (yd23b);
```

```
yd23b = midd2b-midd3b;
NEW (yd24b);
yd24b = midd2b-midd4b;
NEW (yd25b);
yd25b = midd2b-midd5b;
NEW (yd34b);
yd34b = midd3b-midd4b;
NEW (yd35b);
yd35b = midd3b-midd5b;
NEW (yd45b);
yd45b = midd4b-midd5b;
NEW (yd12c);
yd12c = midd1c-midd2c;
NEW (yd13c);
yd13c = midd1c-midd3c;
NEW (yd14c);
yd14c = midd1c-midd4c;
NEW (yd15c);
yd15c = midd1c-midd5c;
NEW (yd23c);
yd23c = midd2c-midd3c;
NEW (yd24c);
yd24c = midd2c-midd4c;
NEW (yd25c);
yd25c = midd2c-midd5c;
NEW (yd34c);
yd34c = midd3c-midd4c;
NEW (yd35c);
yd35c = midd3c-midd5c;
NEW (yd45c);
yd45c = midd4c-midd5c;
NEW (yd12d);
yd12d = midd1d-midd2d;
NEW (yd13d);
yd13d = midd1d-midd3d;
NEW (yd14d);
yd14d = midd1d-midd4d;
NEW (yd15d);
yd15d = midd1d-midd5d;
NEW (yd23d);
yd23d = midd2d-midd3d;
NEW (yd24d);
yd24d = midd2d-midd4d;
NEW (yd25d);
yd25d = midd2d-midd5d;
NEW (yd34d);
yd34d = midd3d-midd4d;
NEW (yd35d);
yd35d = midd3d-midd5d;
NEW (yd45d);
```

```
yd45d = midd4d-midd5d;
NEW (yd12e);
yd12e = midd1e-midd2e;
NEW (yd13e);
yd13e = midd1e-midd3e;
NEW (yd14e);
yd14e = midd1e-midd4e;
NEW (yd15e);
yd15e = midd1e-midd5e;
NEW (yd23e);
yd23e = midd2e-midd3e;
NEW (yd24e);
yd24e = midd2e-midd4e;
NEW (yd25e);
yd25e = midd2e-midd5e;
NEW (yd34e);
yd34e = midd3e-midd4e;
NEW (yd35e);
yd35e = midd3e-midd5e;
NEW (yd45e);
yd45e = midd4e-midd5e;
NEW (yd12f);
yd12f = midd1f-midd2f;
NEW (yd13f);
yd13f = midd1f-midd3f;
NEW (yd14f);
yd14f = midd1f-midd4f;
NEW (yd15f);
yd15f = midd1f-midd5f;
NEW (yd23f);
yd23f = midd2f-midd3f;
NEW (yd24f);
yd24f = midd2f-midd4f;
NEW (yd25f);
yd25f = midd2f-midd5f;
NEW (yd34f);
yd34f = midd3f-midd4f;
NEW (yd35f);
yd35f = midd3f-midd5f;
NEW (yd45f);
yd45f = midd4f-midd5f;
NEW (yd12g);
yd12g = midd1g-midd2g;
NEW (yd13g);
yd13g = midd1g-midd3g;
NEW (yd14g);
yd14g = midd1g-midd4g;
NEW (yd15g);
yd15g = midd1g-midd5g;
NEW (yd23g);
```

```
yd23g = midd2g-midd3g;
NEW (yd24g);
yd24g = midd2g-midd4g;
NEW (yd25g);
yd25g = midd2g-midd5g;
NEW (yd34g);
yd34g = midd3g-midd4g;
NEW (yd35g);
yd35g = midd3g-midd5g;
NEW (yd45g);
yd45g = midd4g-midd5g;
!!!!!!!!!!!!!!!
!!! Asians !!!
!!!!!!!!!!!!!!!
NEW (ye12a);
ye12a = asia1a-asia2a;
NEW (ye13a);
ye13a = asia1a-asia3a;
NEW (ye14a);
ye14a = asia1a-asia4a;
NEW (ye15a);
ye15a = asia1a-asia5a;
NEW (ye23a);
ye23a = asia2a-asia3a;
NEW (ye24a);
ye24a = asia2a-asia4a;
NEW (ye25a);
ye25a = asia2a-asia5a;
NEW (ye34a);
ye34a = asia3a-asia4a;
NEW (ye35a);
ye35a = asia3a-asia5a;
NEW (ye45a);
ye45a = asia4a-asia5a;
NEW (ye12b);
ye12b = asia1b-asia2b;
NEW (ye13b);
ye13b = asia1b-asia3b;
NEW (ye14b);
ye14b = asia1b-asia4b;
NEW (ye15b);
ye15b = asia1b-asia5b;
NEW (ye23b);
ye23b = asia2b-asia3b;
NEW (ye24b);
ye24b = asia2b-asia4b;
NEW (ye25b);
ye25b = asia2b-asia5b;
NEW (ye34b);
ye34b = asia3b-asia4b;
```

```
NEW (ye35b);
ye35b = asia3b-asia5b;
NEW (ye45b);
ye45b = asia4b-asia5b;
NEW (ye12c);
ye12c = asia1c-asia2c;
NEW (ye13c);
ye13c = asia1c-asia3c;
NEW (ye14c);
ye14c = asia1c-asia4c;
NEW (ye15c);
ye15c = asia1c-asia5c;
NEW (ye23c);
ye23c = asia2c-asia3c;
NEW (ye24c);
ye24c = asia2c-asia4c;
NEW (ye25c);
ye25c = asia2c-asia5c;
NEW (ye34c);
ye34c = asia3c-asia4c;
NEW (ye35c);
ye35c = asia3c-asia5c;
NEW (ye45c);
ye45c = asia4c-asia5c;
NEW (ye12d);
ye12d = asia1d-asia2d;
NEW (ye13d);
ye13d = asia1d-asia3d;
NEW (ye14d);
ye14d = asia1d-asia4d;
NEW (ye15d);
ye15d = asia1d-asia5d;
NEW (ye23d);
ye23d = asia2d-asia3d;
NEW (ye24d);
ye24d = asia2d-asia4d;
NEW (ye25d);
ye25d = asia2d-asia5d;
NEW (ye34d);
ye34d = asia3d-asia4d;
NEW (ye35d);
ye35d = asia3d-asia5d;
NEW (ye45d);
ye45d = asia4d-asia5d;
NEW (ye12e);
ye12e = asia1e-asia2e;
NEW (ye13e);
ye13e = asia1e-asia3e;
NEW (ye14e);
ye14e = asia1e-asia4e;
```

```
NEW (ye15e);
ye15e = asia1e-asia5e;
NEW (ye23e);
ye23e = asia2e-asia3e;
NEW (ye24e);
ye24e = asia2e-asia4e;
NEW (ye25e);
ye25e = asia2e-asia5e;
NEW (ye34e);
ye34e = asia3e-asia4e;
NEW (ye35e);
ye35e = asia3e-asia5e;
NEW (ye45e);
ye45e = asia4e-asia5e;
NEW (ye12f);
ye12f = asia1f-asia2f;
NEW (ye13f);
ye13f = asia1f-asia3f;
NEW (ye14f);
ye14f = asia1f-asia4f;
NEW (ye15f);
ye15f = asia1f-asia5f;
NEW (ye23f);
ye23f = asia2f-asia3f;
NEW (ye24f);
ye24f = asia2f-asia4f;
NEW (ye25f);
ye25f = asia2f-asia5f;
NEW (ye34f);
ye34f = asia3f-asia4f;
NEW (ye35f);
ye35f = asia3f-asia5f;
NEW (ye45f);
ye45f = asia4f-asia5f;
NEW (ye12g);
ye12g = asia1g-asia2g;
NEW (ye13g);
ye13g = asia1g-asia3g;
NEW (ye14g);
ye14g = asia1g-asia4g;
NEW (ye15g);
ye15g = asia1g-asia5g;
NEW (ye23g);
ye23g = asia2g-asia3g;
NEW (ye24g);
ye24g = asia2g-asia4g;
NEW (ye25g);
ye25g = asia2g-asia5g;
NEW (ye34g);
ye34g = asia3g-asia4g;
```

```
NEW (ye35g);
ye35g = asia3g-asia5g;
NEW (ye45g);
ye45g = asia4g-asia5g;
! z = Intergroup comparison (between cultural groups)
! a to e (second parameter) = profile 1 to 5
! 12 = comparison between cultural groups 1 and 2
! a to g (fifth parameter) = outcome identification.
!!!!!!!!!!!!!!!!!
!!!profile 1!!!
!!!!!!!!!!!!!!!!!
NEW (za12a);
za12a = aus1a-idau1a;
NEW (za12b);
za12b = aus1b-idau1b;
NEW (za12c);
za12c = aus1c-idau1c;
NEW (za12d);
za12d = aus1d-idau1d;
NEW (za12e);
za12e = aus1e-idau1e;
NEW (za12f);
za12f = aus1f-idau1f;
NEW (za12g);
za12g = aus1g-idau1g;
NEW (za13a);
za13a = aus1a-idam1a;
NEW (za13b);
za13b = aus1b-idam1b;
NEW (za13c);
za13c = aus1c-idam1c;
NEW (za13d);
za13d = aus1d-idam1d;
NEW (za13e);
za13e = aus1e-idam1e;
NEW (za13f);
za13f = aus1f-idam1f;
NEW (za13g);
za13g = aus1g-idam1g;
NEW (za14a);
za14a = aus1a-midd1a;
NEW (za14b);
za14b = aus1b-midd1b;
NEW (za14c);
za14c = aus1c-midd1c;
NEW (za14d);
za14d = aus1d-midd1d;
NEW (za14e);
za14e = aus1e-midd1e;
NEW (za14f);
```

```
za14f = aus1f-midd1f;
NEW (za14g);
za14g = aus1g-midd1g;
NEW (za15a);
za15a = aus1a-asia1a;
NEW (za15b);
za15b = aus1b-asia1b;
NEW (za15c);
za15c = aus1c-asia1c;
NEW (za15d);
za15d = aus1d-asia1d;
NEW (za15e);
za15e = aus1e-asia1e;
NEW (za15f);
za15f = aus1f-asia1f;
NEW (za15g);
za15g = aus1g-asia1g;
NEW (za23a);
za23a = idau1a-idam1a;
NEW (za23b);
za23b = idau1b-idam1b;
NEW (za23c);
za23c = idau1c-idam1c;
NEW (za23d);
za23d = idau1d-idam1d;
NEW (za23e);
za23e = idau1e-idam1e;
NEW (za23f);
za23f = idau1f-idam1f;
NEW (za23g);
za23g = idau1g-idam1g;
NEW (za24a);
za24a = idau1a-midd1a;
NEW (za24b);
za24b = idau1b-midd1b;
NEW (za24c);
za24c = idau1c-midd1c;
NEW (za24d);
za24d = idau1d-midd1d;
NEW (za24e);
za24e = idau1e-midd1e;
NEW (za24f);
za24f = idau1f-midd1f;
NEW (za24g);
za24g = idau1g-midd1g
NEW (za25a);
za25a = idau1a-asia1a;
NEW (za25b);
za25b = idau1b-asia1b;
NEW (za25c);
```

```
za25c = idau1c-asia1c;
NEW (za25d);
za25d = idau1d-asia1d;
NEW (za25e);
za25e = idau1e-asia1e;
NEW (za25f);
za25f = idau1f-asia1f;
NEW (za25g);
za25g = idau1g-asia1g;
NEW (za34a);
za34a = idam1a-midd1a;
NEW (za34b);
za34b = idam1b-midd1b;
NEW (za34c);
za34c = idam1c-midd1c;
NEW (za34d);
za34d = idam1d-midd1d;
NEW (za34e);
za34e = idam1e-midd1e;
NEW (za34f);
za34f = idam1f-midd1f;
NEW (za34g);
za34g = idam1g-midd1g;
NEW (za35a);
za35a = idam1a-asia1a;
NEW (za35b);
za35b = idam1b-asia1b;
NEW (za35c);
za35c = idam1c-asia1c;
NEW (za35d);
za35d = idam1d-asia1d;
NEW (za35e);
za35e = idam1e-asia1e;
NEW (za35f);
za35f = idam1f-asia1f;
NEW (za35g);
za35g = idam1g-asia1g;
NEW (za45a);
za45a = idam1a-asia1a;
NEW (za45b);
za45b = idam1b-asia1b;
NEW (za45c);
za45c = idam1c-asia1c;
NEW (za45d);
za45d = idam1d-asia1d;
NEW (za45e);
za45e = idam1e-asia1e;
NEW (za45f);
za45f = idam1f-asia1f;
NEW (za45g);
```

```
za45g = idam1g-asia1g;
!!!!!!!!!!!!!!!!
!!!profile 2!!!
!!!!!!!!!!!!!!!!
NEW (zb12a);
zb12a = aus2a-idau2a;
NEW (zb12b);
zb12b = aus2b-idau2b;
NEW (zb12c);
zb12c = aus2c-idau2c;
NEW (zb12d);
zb12d = aus2d-idau2d;
NEW (zb12e);
zb12e = aus2e-idau2e;
NEW (zb12f);
zb12f = aus2f-idau2f;
NEW (zb12g);
zb12g = aus2g-idau2g;
NEW (zb13a);
zb13a = aus2a-idam2a;
NEW (zb13b);
zb13b = aus2b-idam2b;
NEW (zb13c);
zb13c = aus2c-idam2c;
NEW (zb13d);
zb13d = aus2d-idam2d;
NEW (zb13e);
zb13e = aus2e-idam2e;
NEW (zb13f);
zb13f = aus2f-idam2f;
NEW (zb13g);
zb13g = aus2g-idam2g;
NEW (zb14a);
zb14a = aus2a-midd2a;
NEW (zb14b);
zb14b = aus2b-midd2b;
NEW (zb14c);
zb14c = aus2c-midd2c;
NEW (zb14d);
zb14d = aus2d-midd2d;
NEW (zb14e);
zb14e = aus2e-midd2e;
NEW (zb14f);
zb14f = aus2f-midd2f;
NEW (zb14g);
zb14g = aus2g-midd2g;
NEW (zb15a);
zb15a = aus2a-asia2a;
NEW (zb15b);
zb15b = aus2b-asia2b;
```

```
NEW (zb15c);
zb15c = aus2c-asia2c;
NEW (zb15d);
zb15d = aus2d-asia2d;
NEW (zb15e);
zb15e = aus2e-asia2e;
NEW (zb15f);
zb15f = aus2f-asia2f;
NEW (zb15g);
zb15g = aus2g-asia2g;
NEW (zb23a);
zb23a = idau2a-idam2a;
NEW (zb23b);
zb23b = idau2b-idam2b;
NEW (zb23c);
zb23c = idau2c-idam2c;
NEW (zb23d);
zb23d = idau2d-idam2d;
NEW (zb23e);
zb23e = idau2e-idam2e;
NEW (zb23f);
zb23f = idau2f-idam2f;
NEW (zb23g);
zb23g = idau2g-idam2g;
NEW (zb24a);
zb24a = idau2a-midd2a;
NEW (zb24b);
zb24b = idau2b-midd2b;
NEW (zb24c);
zb24c = idau2c-midd2c;
NEW (zb24d);
zb24d = idau2d-midd2d;
NEW (zb24e);
zb24e = idau2e-midd2e;
NEW (zb24f);
zb24f = idau2f-midd2f;
NEW (zb24g);
zb24g = idau2g-midd2g;
NEW (zb25a);
zb25a = idau2a-asia2a;
NEW (zb25b);
zb25b = idau2b-asia2b;
NEW (zb25c);
zb25c = idau2c-asia2c;
NEW (zb25d);
zb25d = idau2d-asia2d;
NEW (zb25e);
zb25e = idau2e-asia2e;
NEW (zb25f);
zb25f = idau2f-asia2f;
```

```
NEW (zb25g);
zb25g = idau2g-asia2g;
NEW (zb34a);
zb34a = idam2a-midd2a;
NEW (zb34b);
zb34b = idam2b-midd2b;
NEW (zb34c);
zb34c = idam2c-midd2c;
NEW (zb34d);
zb34d = idam2d-midd2d;
NEW (zb34e);
zb34e = idam2e-midd2e;
NEW (zb34f);
zb34f = idam2f-midd2f;
NEW (zb34g);
zb34g = idam2g-midd2g;
NEW (zb35a);
zb35a = idam2a-asia2a;
NEW (zb35b);
zb35b = idam2b-asia2b;
NEW (zb35c);
zb35c = idam2c-asia2c;
NEW (zb35d);
zb35d = idam2d-asia2d;
NEW (zb35e);
zb35e = idam2e-asia2e;
NEW (zb35f);
zb35f = idam2f-asia2f;
NEW (zb35g);
zb35g = idam2g-asia2g;
NEW (zb45a);
zb45a = idam2a-asia2a;
NEW (zb45b);
zb45b = idam2b-asia2b;
NEW (zb45c);
zb45c = idam2c-asia2c;
NEW (zb45d);
zb45d = idam2d-asia2d;
NEW (zb45e);
zb45e = idam2e-asia2e;
NEW (zb45f);
zb45f = idam2f-asia2f;
NEW (zb45g);
zb45g = idam2g-asia2g;
!!!!!!!!!!!!!!!!
!!!profile 3!!!
!!!!!!!!!!!!!!!!
NEW (zc12a);
zc12a = aus3a-idau3a;
NEW (zc12b);
```

```
zc12b = aus3b-idau3b;
NEW (zc12c);
zc12c = aus3c-idau3c;
NEW (zc12d);
zc12d = aus3d-idau3d;
NEW (zc12e);
zc12e = aus3e-idau3e;
NEW (zc12f);
zc12f = aus3f-idau3f;
NEW (zc12g);
zc12g = aus3g-idau3g;
NEW (zc13a);
zc13a = aus3a-idam3a;
NEW (zc13b);
zc13b = aus3b-idam3b;
NEW (zc13c);
zc13c = aus3c-idam3c;
NEW (zc13d);
zc13d = aus3d-idam3d;
NEW (zc13e);
zc13e = aus3e-idam3e;
NEW (zc13f);
zc13f = aus3f-idam3f;
NEW (zc13g);
zc13g = aus3g-idam3g;
NEW (zc14a);
zc14a = aus3a-midd3a;
NEW (zc14b);
zc14b = aus3b-midd3b;
NEW (zc14c);
zc14c = aus3c-midd3c;
NEW (zc14d);
zc14d = aus3d-midd3d;
NEW (zc14e);
zc14e = aus3e-midd3e;
NEW (zc14f);
zc14f = aus3f-midd3f;
NEW (zc14g);
zc14g = aus3g-midd3g;
NEW (zc15a);
zc15a = aus3a-asia3a;
NEW (zc15b);
zc15b = aus3b-asia3b;
NEW (zc15c);
zc15c = aus3c-asia3c;
NEW (zc15d);
zc15d = aus3d-asia3d;
NEW (zc15e);
zc15e = aus3e-asia3e;
NEW (zc15f);
```

```
zc15f = aus3f-asia3f;
NEW (zc15g);
zc15g = aus3g-asia3g;
NEW (zc23a);
zc23a = idau3a-idam3a;
NEW (zc23b);
zc23b = idau3b-idam3b;
NEW (zc23c);
zc23c = idau3c-idam3c;
NEW (zc23d);
zc23d = idau3d-idam3d;
NEW (zc23e);
zc23e = idau3e-idam3e;
NEW (zc23f);
zc23f = idau3f-idam3f;
NEW (zc23g);
zc23g = idau3g-idam3g;
NEW (zc24a);
zc24a = idau3a-midd3a;
NEW (zc24b);
zc24b = idau3b-midd3b;
NEW (zc24c);
zc24c = idau3c-midd3c;
NEW (zc24d);
zc24d = idau3d-midd3d;
NEW (zc24e);
zc24e = idau3e-midd3e;
NEW (zc24f);
zc24f = idau3f-midd3f;
NEW (zc24g);
zc24g = idau3g-midd3g;
NEW (zc25a);
zc25a = idau3a-asia3a;
NEW (zc25b);
zc25b = idau3b-asia3b;
NEW (zc25c);
zc25c = idau3c-asia3c;
NEW (zc25d);
zc25d = idau3d-asia3d;
NEW (zc25e);
zc25e = idau3e-asia3e;
NEW (zc25f);
zc25f = idau3f-asia3f;
NEW (zc25g);
zc25g = idau3g-asia3g;
NEW (zc34a);
zc34a = idam3a-midd3a;
NEW (zc34b);
zc34b = idam3b-midd3b;
NEW (zc34c);
```

```
zc34c = idam3c-midd3c;
NEW (zc34d);
zc34d = idam3d-midd3d;
NEW (zc34e);
zc34e = idam3e-midd3e;
NEW (zc34f);
zc34f = idam3f-midd3f;
NEW (zc34g);
zc34g = idam3g-midd3g;
NEW (zc35a);
zc35a = idam3a-asia3a;
NEW (zc35b);
zc35b = idam3b-asia3b;
NEW (zc35c);
zc35c = idam3c-asia3c;
NEW (zc35d);
zc35d = idam3d-asia3d;
NEW (zc35e);
zc35e = idam3e-asia3e;
NEW (zc35f);
zc35f = idam3f-asia3f;
NEW (zc35g);
zc35g = idam3g-asia3g;

NEW (zc45a);
zc45a = idam3a-asia3a;
NEW (zc45b);
zc45b = idam3b-asia3b;
NEW (zc45c);
zc45c = idam3c-asia3c;
NEW (zc45d);
zc45d = idam3d-asia3d;
NEW (zc45e);
zc45e = idam3e-asia3e;
NEW (zc45f);
zc45f = idam3f-asia3f;
NEW (zc45g);
zc45g = idam3g-asia3g;
!!!!!!!!!!!!!!!!
!!!profile 4!!!
!!!!!!!!!!!!!!!!
NEW (zd12a);
zd12a = aus4a-idau4a;
NEW (zd12b);
zd12b = aus4b-idau4b;
NEW (zd12c);
zd12c = aus4c-idau4c;
NEW (zd12d);
zd12d = aus4d-idau4d;
NEW (zd12e);
```

```
zd12e = aus4e-idau4e;
NEW (zd12f);
zd12f = aus4f-idau4f;
NEW (zd12g);
zd12g = aus4g-idau4g;
NEW (zd13a);
zd13a = aus4a-idam4a;
NEW (zd13b);
zd13b = aus4b-idam4b;
NEW (zd13c);
zd13c = aus4c-idam4c;
NEW (zd13d);
zd13d = aus4d-idam4d;
NEW (zd13e);
zd13e = aus4e-idam4e;
NEW (zd13f);
zd13f = aus4f-idam4f;
NEW (zd13g);
zd13g = aus4g-idam4g;
NEW (zd14a);
zd14a = aus4a-midd4a;
NEW (zd14b);
zd14b = aus4b-midd4b;
NEW (zd14c);
zd14c = aus4c-midd4c;
NEW (zd14d);
zd14d = aus4d-midd4d;
NEW (zd14e);
zd14e = aus4e-midd4e;
NEW (zd14f);
zd14f = aus4f-midd4f;
NEW (zd14g);
zd14g = aus4g-midd4g;
NEW (zd15a);
zd15a = aus4a-asia4a;
NEW (zd15b);
zd15b = aus4b-asia4b;
NEW (zd15c);
zd15c = aus4c-asia4c;
NEW (zd15d);
zd15d = aus4d-asia4d;
NEW (zd15e);
zd15e = aus4e-asia4e;
NEW (zd15f);
zd15f = aus4f-asia4f;
NEW (zd15g);
zd15g = aus4g-asia4g;
NEW (zd23a);
zd23a = idau4a-idam4a;
NEW (zd23b);
```

```
zd23b = idau4b-idam4b;
NEW (zd23c);
zd23c = idau4c-idam4c;
NEW (zd23d);
zd23d = idau4d-idam4d;
NEW (zd23e);
zd23e = idau4e-idam4e;
NEW (zd23f);
zd23f = idau4f-idam4f;
NEW (zd23g);
zd23g = idau4g-idam4g;
NEW (zd24a);
zd24a = idau4a-midd4a;
NEW (zd24b);
zd24b = idau4b-midd4b;
NEW (zd24c);
zd24c = idau4c-midd4c;
NEW (zd24d);
zd24d = idau4d-midd4d;
NEW (zd24e);
zd24e = idau4e-midd4e;
NEW (zd24f);
zd24f = idau4f-midd4f;
NEW (zd24g);
zd24g = idau4g-midd4g;
NEW (zd25a);
zd25a = idau4a-asia4a;
NEW (zd25b);
zd25b = idau4b-asia4b;
NEW (zd25c);
zd25c = idau4c-asia4c;
NEW (zd25d);
zd25d = idau4d-asia4d;
NEW (zd25e);
zd25e = idau4e-asia4e;
NEW (zd25f);
zd25f = idau4f-asia4f;
NEW (zd25g);
zd25g = idau4g-asia4g;
NEW (zd34a);
zd34a = idam4a-midd4a;
NEW (zd34b);
zd34b = idam4b-midd4b;
NEW (zd34c);
zd34c = idam4c-midd4c;
NEW (zd34d);
zd34d = idam4d-midd4d;
NEW (zd34e);
zd34e = idam4e-midd4e;
NEW (zd34f);
```

```
zd34f = idam4f-midd4f;
NEW (zd34g);
zd34g = idam4g-midd4g;
NEW (zd35a);
zd35a = idam4a-asia4a;
NEW (zd35b);
zd35b = idam4b-asia4b;
NEW (zd35c);
zd35c = idam4c-asia4c;
NEW (zd35d);
zd35d = idam4d-asia4d;
NEW (zd35e);
zd35e = idam4e-asia4e;
NEW (zd35f);
zd35f = idam4f-asia4f;
NEW (zd35g);
zd35g = idam4g-asia4g;
NEW (zd45a);
zd45a = idam4a-asia4a;
NEW (zd45b);
zd45b = idam4b-asia4b;
NEW (zd45c);
zd45c = idam4c-asia4c;
NEW (zd45d);
zd45d = idam4d-asia4d;
NEW (zd45e);
zd45e = idam4e-asia4e;
NEW (zd45f);
zd45f = idam4f-asia4f;
NEW (zd45g);
zd45g = idam4g-asia4g;
!!!!!!!!!!!!!!!!
!!!profile 5!!!
!!!!!!!!!!!!!!!!
NEW (ze12a);
ze12a = aus5a-idau5a;
NEW (ze12b);
ze12b = aus5b-idau5b;
NEW (ze12c);
ze12c = aus5c-idau5c;
NEW (ze12d);
ze12d = aus5d-idau5d;
NEW (ze12e);
ze12e = aus5e-idau5e;
NEW (ze12f);
ze12f = aus5f-idau5f;
NEW (ze12g);
ze12g = aus5g-idau5g;
NEW (ze13a);
ze13a = aus5a-idam5a;
```

```
NEW (ze13b);
ze13b = aus5b-idam5b;
NEW (ze13c);
ze13c = aus5c-idam5c;
NEW (ze13d);
ze13d = aus5d-idam5d;
NEW (ze13e);
ze13e = aus5e-idam5e;
NEW (ze13f);
ze13f = aus5f-idam5f;
NEW (ze13g);
ze13g = aus5g-idam5g;
NEW (ze14a);
ze14a = aus5a-midd5a;
NEW (ze14b);
ze14b = aus5b-midd5b;
NEW (ze14c);
ze14c = aus5c-midd5c;
NEW (ze14d);
ze14d = aus5d-midd5d;
NEW (ze14e);
ze14e = aus5e-midd5e;
NEW (ze14f);
ze14f = aus5f-midd5f;
NEW (ze14g);
ze14g = aus5g-midd5g;
NEW (ze15a);
ze15a = aus5a-asia5a;
NEW (ze15b);
ze15b = aus5b-asia5b;
NEW (ze15c);
ze15c = aus5c-asia5c;
NEW (ze15d);
ze15d = aus5d-asia5d;
NEW (ze15e);
ze15e = aus5e-asia5e;
NEW (ze15f);
ze15f = aus5f-asia5f;
NEW (ze15g);
ze15g = aus5g-asia5g;
NEW (ze23a);
ze23a = idau5a-idam5a;
NEW (ze23b);
ze23b = idau5b-idam5b;
NEW (ze23c);
ze23c = idau5c-idam5c;
NEW (ze23d);
ze23d = idau5d-idam5d;
NEW (ze23e);
ze23e = idau5e-idam5e;
```

```
NEW (ze23f);
ze23f = idau5f-idam5f;
NEW (ze23g);
ze23g = idau5g-idam5g;
NEW (ze24a);
ze24a = idau5a-midd5a;
NEW (ze24b);
ze24b = idau5b-midd5b;
NEW (ze24c);
ze24c = idau5c-midd5c;
NEW (ze24d);
ze24d = idau5d-midd5d;
NEW (ze24e);
ze24e = idau5e-midd5e;
NEW (ze24f);
ze24f = idau5f-midd5f;
NEW (ze24g);
ze24g = idau5g-midd5g;
NEW (ze25a);
ze25a = idau5a-asia5a;
NEW (ze25b);
ze25b = idau5b-asia5b;
NEW (ze25c);
ze25c = idau5c-asia5c;
NEW (ze25d);
ze25d = idau5d-asia5d;
NEW (ze25e);
ze25e = idau5e-asia5e;
NEW (ze25f);
ze25f = idau5f-asia5f;
NEW (ze25g);
ze25g = idau5g-asia5g;
NEW (ze34a);
ze34a = idam5a-midd5a;
NEW (ze34b);
ze34b = idam5b-midd5b;
NEW (ze34c);
ze34c = idam5c-midd5c;
NEW (ze34d);
ze34d = idam5d-midd5d;
NEW (ze34e);
ze34e = idam5e-midd5e;
NEW (ze34f);
ze34f = idam5f-midd5f;
NEW (ze34g);
ze34g = idam5g-midd5g;
NEW (ze35a);
ze35a = idam5a-asia5a;
NEW (ze35b);
ze35b = idam5b-asia5b;
```

NEW (ze35c);
ze35c = idam5c-asia5c;
NEW (ze35d);
ze35d = idam5d-asia5d;
NEW (ze35e);
ze35e = idam5e-asia5e;
NEW (ze35f);
ze35f = idam5f-asia5f;
NEW (ze35g);
ze35g = idam5g-asia5g;
NEW (ze45a);
ze45a = idam5a-asia5a;
NEW (ze45b);
ze45b = idam5b-asia5b;
NEW (ze45c);
ze45c = idam5c-asia5c;
NEW (ze45d);
ze45d = idam5d-asia5d;
NEW (ze45e);
ze45e = idam5e-asia5e;
NEW (ze45f);
ze45f = idam5f-asia5f;
NEW (ze45g);
ze45g = idam5g-asia5g;
OUTPUT: STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;

Mplus Input to Estimate an Explanatory Similarity Model for a Latent Profile Analysis

```
! Annotations only focus on functions not previously defined.
! This model builds from the model of partial distribution invariance.
! To ensure stability, starts values from the previously most invariant solution (partial
distribution invariance) should be used.
DATA:
FILE IS FSCORES IC.dat;
VARIABLE:
NAME = ID1 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN T1ET SVLUE PSPP
STUPP LSCHL AFSCH NPEER PPEER SURFSTRA DEEPSTRA HIGHSC UNIVER JOB
FAMILY SOCIETY;
USEVARIABLES = TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN SURFSTRA
DEEPSTRA HIGHSC UNIVER JOB FAMILY SOCIETY;
MISSING are all *; IDVARIABLE = ID1;
KNOWNCLASS = cg (t1et = 1 t1et = 2 t1et = 3 t1et = 4 t1et = 5);
CLASSES = cg (5) c (5);
ANALYSIS:
TYPE = MIXTURE; ESTIMATOR = MLR; STARTS = 10000 500; STITERATIONS =
1000;
! To ensure that the latent profile solution remains unchanged by the inclusion of predictors,
        starts
! values from the final retained model without covariates (predictors/outcomes) can be used
        and the
! random starts fixed to 0. STARTS = 0;
MODEL:
%OVERALL%
  c#1 on cg#1; c#2 on cg#1; c#3 on cg#1; c#4 on cg#1;
  c#1 on cg#2 (p1); c#2 on cg#2 (p2); c#3 on cg#2 (p3); c#4 on cg#2 (p4);
  c#1 on cg#3 (p1); c#2 on cg#3 (p2); c#3 on cg#3 (p3); c#4 on cg#3 (p4);
  c#1-c#4 on cg#4@0;
! This model is almost identical to the previous one except that the parameter labels are used
to
! constrain the outcome means to be invariant across cultural groups.
! As a result, less lines of code are required in the MODEL CONSTRAINT section.
! See all sections in bold.
%cg#1.c#1%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d);
[JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
 %cg#1.c#2%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d);
[JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
 %cg#1.c#3%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d);
```

[JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
%cg#1.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d);
[JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
%cg#1.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus33-maus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus33-vaus40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d);
[JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
%cg#2.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d);
[JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
%cg#2.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d);
[JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
%cg#2.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d);
[JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
%cg#2.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d);
[JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
%cg#2.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d);
[JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
%cg#3.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d);
[JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
%cg#3.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d);
[JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
%cg#3.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d);

[JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
%cg#3.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d);
[JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
%cg#3.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](midaus33-midaus40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vidaus33-vidaus40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d);
[JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
%cg#4.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d);
[JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
%cg#4.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d);
[JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
%cg#4.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d);
[JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
%cg#4.c#4%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d);
[JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
%cg#4.c#5%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d);
[JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
%cg#5.c#1%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus1-maus8);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus1-vaus8);
[SURFSTRA](aus1a); [DEEPSTRA](aus1b); [HIGHSC](aus1c); [UNIVER](aus1d);
[JOB](aus1e); [FAMILY](aus1f); [SOCIETY](aus1g);
%cg#5.c#2%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus9-maus16);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus9-vaus16);
[SURFSTRA](aus2a); [DEEPSTRA](aus2b); [HIGHSC](aus2c); [UNIVER](aus2d);
[JOB](aus2e); [FAMILY](aus2f); [SOCIETY](aus2g);
%cg#5.c#3%
[TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus17-maus24);
TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus17-vaus24);
[SURFSTRA](aus3a); [DEEPSTRA](aus3b); [HIGHSC](aus3c); [UNIVER](aus3d);

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[JOB](aus3e); [FAMILY](aus3f); [SOCIETY](aus3g);
 %cg#5.c#4%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](maus25-maus32);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vaus25-vaus32);
[SURFSTRA](aus4a); [DEEPSTRA](aus4b); [HIGHSC](aus4c); [UNIVER](aus4d);
[JOB](aus4e); [FAMILY](aus4f); [SOCIETY](aus4g);
 %cg#5.c#5%
 [TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN](mmidd33-mmidd40);
 TASK EFFO COMP SOCP AFFL SCRN PRSE TKEN(vmidd33-vmidd40);
[SURFSTRA](aus5a); [DEEPSTRA](aus5b); [HIGHSC](aus5c); [UNIVER](aus5d);
[JOB](aus5e); [FAMILY](aus5f); [SOCIETY](aus5g);
MODEL CONSTRAINT:
! The model constraint function uses the labels used with the outcomes to request mean level
comparisons on the outcomes across profiles.
NEW (ya12a);
ya12a = aus1a-aus2a;
NEW (ya13a);
ya13a = aus1a-aus3a;
NEW (ya14a);
ya14a = aus1a-aus4a;
NEW (ya15a);
ya15a = aus1a-aus5a;
NEW (ya23a);
ya23a = aus2a-aus3a;
NEW (ya24a);
ya24a = aus2a-aus4a;
NEW (ya25a);
ya25a = aus2a-aus5a;
NEW (ya34a);
ya34a = aus3a-aus4a;
NEW (ya35a);
ya35a = aus3a-aus5a;
NEW (ya45a);
ya45a = aus4a-aus5a;
NEW (ya12b);
ya12b = aus1b-aus2b;
NEW (ya13b);
ya13b = aus1b-aus3b;
NEW (ya14b);
ya14b = aus1b-aus4b;
NEW (ya15b);
ya15b = aus1b-aus5b;
NEW (ya23b);
ya23b = aus2b-aus3b;
NEW (ya24b);
ya24b = aus2b-aus4b;
NEW (ya25b);
ya25b = aus2b-aus5b;
NEW (ya34b);
ya34b = aus3b-aus4b;
```

```
NEW (ya35b);
ya35b = aus3b-aus5b;
NEW (ya45b);
ya45b = aus4b-aus5b;
EW (ya12c);
ya12c = aus1c-aus2c;
NEW (ya13c);
ya13c = aus1c-aus3c;
NEW (ya14c);
ya14c = aus1c-aus4c;
NEW (ya15c);
ya15c = aus1c-aus5c;
NEW (ya23c);
ya23c = aus2c-aus3c;
NEW (ya24c);
ya24c = aus2c-aus4c;
NEW (ya25c);
ya25c = aus2c-aus5c;
NEW (ya34c);
ya34c = aus3c-aus4c;
NEW (ya35c);
ya35c = aus3c-aus5c;
NEW (ya45c);
ya45c = aus4c-aus5c;
NEW (ya12d);
ya12d = aus1d-aus2d;
NEW (ya13d);
ya13d = aus1d-aus3d;
NEW (ya14d);
ya14d = aus1d-aus4d;
NEW (ya15d);
ya15d = aus1d-aus5d;
NEW (ya23d);
ya23d = aus2d-aus3d;
NEW (ya24d);
ya24d = aus2d-aus4d;
NEW (ya25d);
ya25d = aus2d-aus5d;
NEW (ya34d);
ya34d = aus3d-aus4d;
NEW (ya35d);
ya35d = aus3d-aus5d;
NEW (ya45d);
ya45d = aus4d-aus5d;
NEW (ya12e);
ya12e = aus1e-aus2e;
NEW (ya13e);
ya13e = aus1e-aus3e;
NEW (ya14e);
ya14e = aus1e-aus4e;
```

```
NEW (ya15e);
ya15e = aus1e-aus5e;
NEW (ya23e);
ya23e = aus2e-aus3e;
NEW (ya24e);
ya24e = aus2e-aus4e;
NEW (ya25e);
ya25e = aus2e-aus5e;
NEW (ya34e);
ya34e = aus3e-aus4e;
NEW (ya35e);
ya35e = aus3e-aus5e;
NEW (ya45e);
ya45e = aus4e-aus5e;
NEW (ya12f);
ya12f = aus1f-aus2f;
NEW (ya13f);
ya13f = aus1f-aus3f;
NEW (ya14f);
ya14f = aus1f-aus4f;
NEW (ya15f);
ya15f = aus1f-aus5f;
NEW (ya23f);
ya23f = aus2f-aus3f;
NEW (ya24f);
ya24f = aus2f-aus4f;
NEW (ya25f);
ya25f = aus2f-aus5f;
NEW (ya34f);
ya34f = aus3f-aus4f;
NEW (ya35f);
ya35f = aus3f-aus5f;
NEW (ya45f);
ya45f = aus4f-aus5f;
NEW (ya12g);
ya12g = aus1g-aus2g;
NEW (ya13g);
ya13g = aus1g-aus3g;
NEW (ya14g);
ya14g = aus1g-aus4g;
NEW (ya15g);
ya15g = aus1g-aus5g;
NEW (ya23g);
ya23g = aus2g-aus3g;
NEW (ya24g);
ya24g = aus2g-aus4g;
NEW (ya25g);
ya25g = aus2g-aus5g;
NEW (ya34g);
ya34g = aus3g-aus4g;
```

NEW (ya35g);
ya35g = aus3g-aus5g;
NEW (ya45g);
ya45g = aus4g-aus5g;
OUTPUT: STDYX SAMPSTAT CINTERVAL MODINDICES (10) SVALUES
RESIDUAL TECH1 TECH7 TECH11 TECH13 TECH14;