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I hereby declare that this thesis / dissertation is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in this thesis / dissertation.

This thesis / dissertation has also not been submitted for any degree in any university previously.

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Abstract

Perceptions of social mobility affect how people evaluate their society and influence support for policies to reduce income inequality. Although prior research has shown that Americans tend to overestimate upward social mobility (Alesina, Stantcheva, & Teso, 2018; Davidai & Gilovich, 2015; Kraus & Tan, 2015), this has not been demonstrated in a non-Western context. The primary goal of this research was to investigate if past findings of overestimations of social mobility would be replicated on a culturally different and non-Western sample (i.e. Singaporeans). A secondary goal was to examine factors that affect mobility perceptions in this sample and uncover possible mechanisms to account for the existing mixed findings on how mobility perceptions vary. The results showed that overall, Singaporean undergraduate students *underestimated* intergenerational social mobility. Mobility perceptions was also found to be higher among those with lower parental education and greater self-enhancement bias. Furthermore, congruence between prescriptive and descriptive meritocratic beliefs mediated the effect of parental education on mobility estimates, such that higher mobility perceptions were linked to lower parental education via higher belief congruence. Although previous research suggest that social class might influence estimates of intergenerational and intragenerational social mobility differently, the current research did not find evidence for moderation by type of mobility estimates. Discussion focused on the effect of different social class

indicators on mobility estimates for college samples and the differences in how individuals might perceive intergenerational and intragenerational social mobility.

Keywords: Social mobility, estimation bias, beliefs, meritocracy, social class.

Table of Contents

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Perceptions of Upward Social Mobility: The Role of Culture, Social Class and Meritocratic Beliefs

Social mobility—the belief that upward mobility is possible for anyone who is willing to work hard, regardless of their social, economic and political background—is an ethos held by individuals across many nations and modern societies. A society high in social mobility reflects a fair system that enables individuals to better their socioeconomic standing, which is critical for reducing poverty and economic inequality.

The promise of increasing social mobility is often evoked by politicians and policy makers across the political spectrum as the basis of their social and economic policies. However, meaningful evaluations of and support for these policies, and the broader system depend, to a large extent, on people's beliefs about the current level of social mobility in their society (Kraus & Tan, 2015). For instance, people who were led to believe that social mobility was high were more likely to tolerate economic inequality (Shariff, Wiwad, & Aknin, 2016), and were also more motivated to defend the status quo in their society (Day & Fiske, 2017), regardless of the actual mobility level. On the other hand, lowering their perception of social mobility increased support for government spending on education and health amongst politically liberal individuals (Alesina, Stantcheva, & Teso, 2018). Beliefs about social mobility have also been found to increase academic persistence, intentions and improve performance in school for students from lower social class backgrounds (Browman, Destin, Carswell, & Svoboda, 2017; Browman et al., 2017). These suggest that support for policies aimed at social protection, as well as reducing economic inequality and achievement gaps will depend

significantly on understanding how individuals across the social class spectrum perceive social mobility levels.

Although social mobility is highly desired, the actual level of mobility within a society may not always align with individuals' hopes, beliefs and expectations. In fact, recent work on American's perceptions of social mobility in their country revealed a striking disconnect between people's perceptions and the actual mobility level. Overall, people were largely inaccurate about the actual level of social mobility in their society (Alesina et al., 2018; Chambers, Swan, & Heesacker, 2015; Davidai & Gilovich, 2015; Kraus & Tan, 2015). However, the direction of inaccuracies found has been inconsistent, with some finding that people overestimated upward social mobility (Alesina et al., 2018; Davidai & Gilovich, 2015, 2018; Kraus & Tan, 2015) and others finding evidence of underestimates (Chambers et al., 2015; Swan, Chambers, Heesacker, & Nero, 2017).

The current research had two major goals. The first was to re-examine people's perceptions of social mobility in a non-Western cultural context that has received little attention in the existing literature. The second goal was to extend the existing findings in the literature by investigating the factors that may shape differences in general perceptions of social mobility. Overall, the results from this research may help to clarify the mixed findings in the literature regarding whether people are more likely to overestimate or underestimate social mobility and provide a deeper understanding on the psychological processes that underlie perceptions of social mobility.

Perceptions of Social Mobility

Individuals' general accuracy in estimating social mobility was first investigated by two independent teams of researchers (Davidai & Gilovich, 2015; Kraus & Tan, 2015). Davidai & Gilovich (2015) asked a sample of Americans to estimate the likelihood of upward and downward social mobility for people born to families in the richest or poorest quintile. *Upward mobility* was operationalized as the likelihood of moving up to the middle or higher quintile among people born in families from the poorest quintile, whereas *downward mobility* was operationalized as the total likelihood of moving down to the middle or lower quintile among people born in families in the highest quintile. The estimates were then compared to publicly available actual mobility statistics in the US. The researchers found that participants overestimated upward social mobility but underestimated downward social mobility significantly. Furthermore, participants who were poor (i.e. annual income less than $25,000), non-white, and politically conservative generally provided higher estimations of upward mobility.

Using different measures, Kraus & Tan (2015) also asked Americans to estimate social mobility in the US and then compared their estimates to actual mobility data. Estimations of social mobility were assessed using six questions, three of which assessed income mobility through effort, and three assessed educational mobility. For *income mobility*, participants were asked to estimate "how many of 100 people would (1) move from the bottom 20% of income by working 1000 extra hours"; "(2) move from the bottom 20% of income to the top 20%"; "(3) move from the top 1% of income to the bottom 80%". For *educational mobility*, participants were asked to estimate "(4) how

many of 100 people would move from the bottom 20% of income with some of college degree;" "(5) how many of 100 top college and university students would be from the top 20% of income families"; and "(6) how many of 100 students would be from the bottom 20% of income families". Consistent with findings by Davidai & Gilovich (2015), Kraus & Tan (2015) found that their participants also overestimated the extent of social mobility relative to available actual mobility statistics. Additionally, they provided experimental evidence that individuals who were exposed to essentialist (versus non-essentialist) explanations of social class, asked to make self-relevant (versus non-self-relevant) estimates, or perceived higher (versus lower) subjective social class, made larger overestimations.

Inconsistencies in the Literature

Although both of these initial studies found that Americans overestimated upward social mobility, another research found the opposite: that Americans *underestimated* upward social mobility (Chambers et al., 2015). One explanation proposed for this contradictory finding was that different sources of actual mobility statistics were used for comparisons in each study (Nero, Swan, Chambers, & Heesacker, 2018). Specifically, Chambers et al. (2015) had compared participants' estimates to mobility statistics based on tax records (Chetty, Hendren, Kline, Saez, & Turner, 2014), while Davidai & Gilovich (2015) had compared participants' estimates to intergenerational mobility statistics from Pew Research Center (2012). However, in one recent research that used the same mobility statistics used in Chambers et al. (2015) for comparison, overestimations of upward mobility by participants were still observed (Alesina et al., 2018). This finding suggests

that the different sources of actual mobility statistics used for comparison cannot fully explain the inconsistent findings.

Another explanation proposed for the discrepant findings was that the order of response options—whether to first estimate the likelihood of remaining at the bottom versus moving to the top—could have primed participants to think about social mobility or immobility (Davidai & Gilovich, 2018). In other words, to first consider the likelihood of remaining at the bottom, as in Chambers et al. (2015), may have primed perceptions of immobility, resulting in lower estimates. In contrast, to first consider the likelihood of moving to the top, as in Davidai & Gilovich (2015), may have primed perceptions of mobility, resulting in higher estimates. Davidai & Gilovich (2018) tested this possibility by manipulating the order of the response options asked. Indeed, asking about the likelihood of a person remaining in the bottom first produced lower estimates of mobility than asking about the likelihood of a person moving to the top first (Davidai & Gilovich, 2018).

A final explanation was that the past studies also differed in the number of social class categories provided for participants to make the mobility estimates. Specifically, making upward mobility estimates using tertiles of lower-class, middle-class and upper-class (Chambers et al., 2015) suggested fewer categories for advancement. This increased the perceived difficulty of moving up the income ladder and reduced mobility estimates, compared to making upward mobility estimates using quintiles of lower-class, lower-middle, middle, upper-middle and upper-class (Davidai & Gilovich, 2015). In two studies that examined this possibility, participants indeed

provided lower estimates of upward mobility based on a society categorized by tertiles of social class than a society categorized by quintiles of social class (Davidai & Gilovich, 2018; Swan et al., 2017). Additionally, participants reported a greater tendency to think about income distribution in United States as consisting five categories instead of three, suggesting that using income distributions in quintiles may be a more valid and meaningful measure for assessing mobility than using income distributions in tertiles (Davidai & Gilovich, 2018).

Lack of Empirical Investigations on Non-Western Samples

To date, all of the available studies on estimations of social mobility have been conducted exclusively on Western samples (Alesina et al., 2018; Davidai & Gilovich, 2015, 2018; Kraus & Tan, 2015). Although informative, it is unclear if these findings are generalizable to non-Western samples.

Cross-cultural theories suggest possible reasons for why findings of overestimation of social mobility in Western samples may not generalize to non-Western samples. A large body of work has established that independent cultures, which characterize most Western countries, differ in various psychological tendencies compared to interdependent cultures, which characterize a significant portion of non-Western countries (Markus & Kitayama, 1991). First, individuals from independent and interdependent cultures differ in their motivation and tendencies to self-enhance, with Westerners more likely to self-enhance than East Asians (Falk, Heine, Yuki, & Takemura, 2009; Hamamura, Heine, & Takemoto, 2007; Heine & Hamamura, 2007; Heine & Lehman, 1997). Although studies assessing the better-than-average effect and optimistic bias found some level of self-enhancement bias

among East Asians, they often did so to a lesser extent than their Western counterparts (Heine & Hamamura, 2007). The lower tendency to self-enhance for interdependent individuals also extended to the group-level, such that they were less likely to enhance their group's status (Heine & Lehman, 1997). These findings suggest that individuals from an interdependent culture who do not self-enhance may provide lower estimates or even underestimates of social mobility, unlike individuals from an independent culture.

Second, individuals from interdependent cultures also differ from those from independent cultures in their cognitive processing styles. Individuals from interdependent cultures tend to adopt holistic style of thinking—by paying more attention to the interaction of the person and the context, while those from independent cultures tend to adopt an analytic style of thinking — by focusing more on the person that is distinct from the context (Choi, Nisbett, & Norenzayan, 1999; Ji, Peng, & Nisbett, 2000; Kitayama, Duffy, Kawamura, & Larsen, 2003; Masuda et al., 2008). For example, in judging the emotion experienced by a target person, Japanese participants' judgments were more influenced by the emotion expressed by individuals surrounding the target than American participants' judgments (Masuda et al., 2008). This cultural difference in emotion perception was further corroborated by eye-tracking data which showed longer times spent on attending to contextual information among the Japanese than the Americans (Masuda et al., 2008). Similarly, compared to Americans, Koreans estimated the likelihood of a trait or behavior (e.g., being talkative) to be higher when the situation facilitated the behavior (e.g., being at a party) and lower when the situation inhibited the behavior (e.g., being at a church service; Norenzayan, Choi, & Nisbett, 2002).

Together, these differences in cognitive styles suggest that when estimating social mobility, individuals from interdependent cultures may rely more heavily on contextual information, such as the mobility of similar others around them, or of those from other countries, in making their judgement.

Overall, these cultural differences in self-enhancement motivation and cognitive processing styles suggest that social mobility estimations may differ between Western and non-Western samples. In particular, non-Western and culturally interdependent individuals may be more likely to base their estimates on their perceptions of the current societal context, which may not necessarily result in overestimates. Given the lack of investigations among non-Western samples and the need to consider the generalizability of past research findings, the primary goal of the current research was to conduct a replication study using similar methods from past research, but in a non-Western and culturally interdependent sample, to examine if these individuals would overestimate or underestimate social mobility.

Factors that Affect Mobility Perceptions

Most research has tested methodological accounts for the mixed findings in mobility estimates but far less attention has been paid to examining the psychological factors that may also systematically shape subjective perceptions of social mobility. So far, past works have found evidence that individual differences, such as social class and political orientation can affect estimates (Chambers et al., 2015; Davidai & Gilovich, 2015; Kraus & Tan, 2015). Therefore, a secondary goal of the current research was to expand on the possible psychological factors that predict perceptions of social mobility,

which may provide deeper insights into the psychological processes that underlie mobility perceptions.

Cultural factors. As proposed earlier, individuals from interdependent cultures who are more likely to adopt a holistic style of thinking and less likely to self-enhance may be also be less likely to overestimate social mobility than those from independent cultures. Furthermore, there may also be within-culture variation in the level of holistic thinking and motivation to self-enhance that affect perceptions of social mobility. If indeed holistic thinking and self-enhancement motivation explain between differences in mobility estimates between individuals from independent versus interdependent cultures, we expected that within culture differences in these same cognitive styles and motivation would also predict differences in mobility estimates. Therefore, we hypothesized that at the individual level within the sample, greater orientation toward holistic thinking and lower motivation to self-enhance would independently predict lower mobility estimates.

Congruence between prescriptive and descriptive meritocratic beliefs. Prescriptive meritocratic beliefs refer to the perception of how meritocracy *should* function (i.e., ideals), and descriptive beliefs refer to the perception of how meritocracy *is currently* functioning (i.e., reality). People may agree with an ideology (e.g. meritocracy) in prescribing how society should function but disagree with the extent that society is functioning according to these ideals. In one research, Zimmerman & Reyna (2013) argued that when individuals experience high disagreement between prescriptive and descriptive beliefs, they are subsequently more likely to perceive greater injustice and feel less satisfied with the society. Consistent

with this argument, they found that high compared to low discrepancy between prescriptive and descriptive beliefs predicted lower perceived legitimacy of the system, lower satisfaction with society, and stronger support for policies that would equalize opportunities between high and low status groups and lower satisfaction with society (Zimmerman & Reyna, 2013). Past work has also found that individuals with more positive attitudes toward the system were more likely to make higher estimates of social mobility (Chambers et al., 2015). Therefore, if individuals with higher congruence in meritocratic beliefs are more likely to perceive the current system as legitimate and view society more positively, we hypothesized that higher congruence in meritocratic beliefs would increase estimates of social mobility. As well, based on the reasonable assumption that high meritocracy is more desirable than low meritocracy, we expected greater endorsement of both prescriptive and descriptive meritocracy to predict higher estimations for social mobility as compared to low endorsement for both.

Social class. Although social class is associated with people's perception of social mobility (Alesina et al., 2018; Davidai & Gilovich, 2015; Kraus & Tan, 2015), the existing findings were inconsistent. While both Alesina et al (2018) and Davidai & Gilovich (2015) found that lower-class individuals overestimated social mobility more than upper-class individuals, Kraus & Tan (2015) found the opposite—that upper-class individuals instead overestimated social mobility more than their lower-class counterparts. Interestingly, despite these opposite patterns, motivations to justify the system as fair were cited as the reason in both studies. In the case of greater overestimations among lower-class individuals, Davidai & Gilovich (2015)

argued that lower-class individuals were motivated to believe in a fair system where their own advancement in society is possible with hard work. In the case of greater overestimations among upper-class individuals, Kraus & Tan (2015) argued that upper-class individuals were motivated to believe in a fair system to justify that their elevated statuses were fairly earned. However, none of these motivations was tested in their studies. Since greater congruence in meritocratic beliefs was theorized to reflect higher perceived legitimacy of the system (Zimmerman & Reyna, 2013), we tested the system justification motivation explanations by examining whether congruence in meritocracy beliefs would mediate the social class differences in estimations of social mobility.

Furthermore, we propose possible explanations as to why lower-class individuals might overestimate upward social mobility more as compared to upper-class individuals. Firstly, when measuring perceptions of upward social mobility in Alesina et al (2018 and Davidai & Gilovich (2015), participants estimate the likelihood of a poor individual moving up to a higher income quintile. For lower-class individuals, estimating the social mobility of a poor target person is a more self-relevant process than for upper-class individuals. Kraus & Tan (2015) found that when the target person is self-relevant, people tended to make higher mobility estimations. Increased self-relevance may also increase motivations and hope for similar others to move up the social ladder. These may explain why higher mobility estimates were observed for lower-class individuals in Alesina et al (2018 and Davidai & Gilovich (2015). On the other hand, as estimating the mobility of a poor target person is less self-relevant for upper-class individuals, they may be more likely to use

dispositional explanations (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012) by attributing one's social class status to their own abilities and effort, and subsequently perceive lower upward social mobility for the poor as due to their lack of such qualities. Together, these differences in target judgment and attributions suggest that lower-class individuals may provide higher mobility estimates than upper-class individuals

In addition to differences in targets who were judged, past studies also measured different types of social mobility, presenting another potential source of the conflicting findings. Whereas Alesina et al (2018) and Davidai & Gilovich (2015) assessed the probability of moving up or down the social rank based on one's family background—a measure of *intergenerational* social mobility—Kraus & Tan (2015) assessed the probability of moving up or down the social rank within an individual's 10-year period—a measure of *intragenerational* social mobility. The intergenerational mobility measure explicitly references family background in relation to mobility ("*Imagine a randomly selected person born to a family in the lowest income quintile…*"), whereas the intragenerational mobility measure explicitly references hard work ("*How many would move from the bottom 20% by working 1000 extra hours?*"). Although it is not immediately clear how these different measures may have led to differences in mobility estimations by social class, in the current research, we assessed both types of social mobility to examine its potential moderating effect. If indeed the mixed findings in the past research was due to the different type of mobility measure used, we expected that for intergenerational mobility, lower-class individuals would make higher estimates than upper-class individuals, whereas for intragenerational mobility,

upper-class individuals would make higher estimates than lower-class individuals.

As social class can be measured by either objective (e.g. household income) or subjective (e.g. subjective social class ranking) indicators, the current paper will also explore if different social class indicators would predict people's perception of social mobility differently. Given that objective and subjective indicators of social class are distinct but related constructs, it is an open question if they would show similar associations with perceptions of social mobility.

The Current Study

In the current research, we sought to re-examine people's estimations of social mobility in a culturally distinct and non-Western sample. The current research was conducted on a sample of participants from Singapore. The focus on this particular sample of participants is ideal for a few reasons. First, compared to most Western countries, Singapore is characterized as higher in interdependence (Hofstede, 2010). Second, Singapore's level of economic development is similar to many other modern Western societies, particularly the US. For instance, in 2017 Singapore's GDP per capita was USD 57.7k while that of the US was USD 59.5k (The World Bank, 2017). Singapore and US also shared a similar intergenerational mobility index, with intergenerational income elasticity, at .44 and .47 respectively (Corak, 2013). As well, both countries in recent years have experienced significantly high income inequality, with Singapore's Gini coefficient at 46.4, while that of US Gini coefficient was at 41.4 (The World Bank, World Development Indicators, 2016). Finally, both countries also share the ethos of meritocracy—the belief

that in their society, hard work should lead to success. In essence, Singapore provided a close cross-cultural parallel to the US as both countries differ primarily in culture, while remaining largely similar economically and in their fundamental beliefs about meritocracy and social mobility.

We sought to replicate the methodology used in the original research (Davidai & Gilovich, 2015; Kraus & Tan, 2015) as closely as possible, while taking into account some of the methodological issues highlighted by recent follow-up research. Based on the finding that people typically think about income distributions in quintiles rather than tertiles (Davidai & Gilovich, 2018), the current research asked participants to estimate social mobility using income quintiles. To test the potential moderating effect of the type of mobility measure on social class differences in mobility estimates, participants were asked to estimate both intergenerational and intragenerational social mobility. The order of response options was also counterbalanced to account for potential priming effects of mobility versus immobility (Davidai & Gilovich, 2018). In other words, participants would be randomly assigned to either estimate the likelihood of remaining in the poorest quintile first (i.e. immobility prime condition), or to estimate the likelihood of moving to the richest quintile first (i.e. mobility prime condition). Following the questions on social mobility, participants then answered questionnaires regarding other key variables in the study (e.g. meritocratic beliefs, better-than-average effect, etc). To rule out alternative explanations, measures of trait optimism and knowledge about social issues were also measured.

Overview of Research Questions and Hypotheses

RQ 1: Would Singaporeans overestimate or underestimate upward intergenerational social mobility in Singapore?

As only census data for upward intergenerational mobility for Singapore (Yip, n.d.) was available, overestimations or underestimations could only be examined with intergenerational mobility, but not with intragenerational mobility.

H1: We hypothesized that Singapore participants would underestimate intergenerational social mobility.

RQ 2: What are the psychological factors that influence estimations of intergenerational social mobility? The factors explored in the current paper were self-enhancement bias (i.e. better-than-average effect, general national pride), holistic thinking style, belief congruence between prescriptive and descriptive meritocratic beliefs, and social class.

H2a: We hypothesized that lower motivation to self-enhance would predict lower intergenerational social mobility estimates.

We reasoned earlier that individuals from interdependent cultures engage in more holistic and thus, are more likely to use contextual information based on what is currently perceived in their society. A review of the current social perceptions in Singapore revealed that 85% of Singaporeans were worried about income inequality in Singapore and 52% did not find the existing policies useful in addressing income inequality (“Widening wealth gap a Singaporean worry,” n.d.). In addition income inequality was cited as the most likely cause of social divide in Singapore by almost half of the survey respondents (Paulo & Low, 2018). Since the current perceptions

suggest a general pessimistic outlook on social mobility, it is likely that Singaporeans, who are culturally interdependent, will base their mobility estimates on this outlook.

H2b: We hypothesized that greater orientation toward holistic thinking would predict lower intergenerational social mobility estimates amongst Singaporeans.

H2c: We hypothesized that greater congruence between descriptive and prescriptive meritocracy would predict higher estimations of intergenerational social mobility (i.e. belief congruence hypothesis). We also expected a significant linear main effect of the predictors such that the level of endorsement for both prescriptive and descriptive beliefs would positively influence perception of social mobility. For instance, when endorsements for meritocratic beliefs are both low, estimation of social mobility is expected be lower than when endorsements for meritocratic beliefs are both high.

H2d: We hypothesized that lower-class individuals would make higher intergenerational social mobility estimates than upper-class individuals.

RQ 3: Would congruence in beliefs about meritocracy mediate the effect of social class on perceptions of social mobility? Building on H2d, we tested if congruence in beliefs about meritocracy, which reflect motivations to justify the system as fair, would explain the higher mobility estimates among lower-class compared to upper-class individuals.

H3: We hypothesized that higher intergenerational social mobility estimates made by lower-class individuals than upper-class individuals would be mediated by higher congruence in meritocratic beliefs among lower-class individuals.

RQ 4: Would the type of mobility estimate moderate the relationship between social class and estimations of social mobility? We sought to explore if the differences in past research in how social class predicted mobility estimates was also due to differences in measures of social mobility used.

H4: We hypothesized that for intergenerational mobility, lower-class individuals would make higher estimates than upper-class individuals, whereas for intragenerational mobility, upper-class individuals would make higher estimates than lower-class individuals.

Method

Participants

Three hundred and ninety-six participants were recruited for the study in exchange for 1 course credit for their participation. All participants were undergraduate students enrolled in Psychology modules in Singapore Management University. We excluded participants who were 1) non-Singaporeans (n = 48), who 2) failed data quality-check items (n = 37), or who 3) did not answer the question on their nationality due to the omission of the question in the pilot study (n = 73). The final sample consisted of 251 participants (70% female), aged between 19 to 28 (M = 21.8, SD = 1.84). 88% of our participants identified themselves as Chinese, 5% identified as Malay and 4% identified as Indian. The remaining 3% of the participants did not identify themselves as any of the main race categories in Singapore. Data was collected over two semesters in AY2018/19, with an initial pilot phase conducted in semester 1.

Procedure

Participants were run in sessions of no more than 25 participants in the university's seminar rooms. They completed the study on their personal laptops via an online survey link provided by research assistants at the beginning of the study session. Participants were asked to provide their informed consent online. After which, participants were asked the first of two data quality check items, where they were asked to indicate their willingness to commit to the survey by providing thoughtful responses (Vannette, 2017). They then proceeded to answer the questions on perceptions of upward social mobility, beliefs in meritocracy, reasons for endorsing prescriptive beliefs, trait optimism, better-than-average effect, holistic thinking, satisfaction with society, general national pride, demographics and knowledge on social class issues. Participants also answered other questionnaires that were unrelated to the purpose of the current study. After completing the survey, participants were probed for their thoughts during the study and their beliefs about the objective of the study. Finally, they were debriefed about the goals of the study.

Measures

Perceptions of upward social mobility. Participants were asked one question on intergenerational and intragenerational social mobility respectively. The questions were modified from Davidai & Gilovich (2015) to fit the Singapore context. For intergenerational mobility, participants estimated the chances that the income of a Singaporean (between 25 to 35 years of age) picked at random would differ from that of his or her parents', whereas for intragenerational mobility, participants estimated the chances that the income

of a Singaporean (between 25 to 35 years of age) picked at random would differ from that of his or her own income in ten years. When considering both questions, participants were asked to imagine that the person's family (or target person) belonged to the poorest 20% of population. Participants then provided a percentage estimation to indicate the likelihood of the person moving to each of the income quintile.

To account for priming effects, the order of response options was counterbalanced. Participants were randomly assigned to rate the likelihood of moving up to the richest 20% first (descending order; mobility prime condition) or rate the likelihood of remaining in the poorest 20% first (ascending order; immobility prime condition). The order of questions for the type of mobility measure (i.e. intergenerational or intragenerational social mobility) was also randomized. The questions assessing intergenerational and intragenerational social mobility are presented in Appendix A.

Beliefs in meritocracy. The questions assessing descriptive and prescriptive meritocracy were adapted from the Meritocratic Beliefs Scale (Zimmerman & Reyna, 2013). For descriptive beliefs (M = 4.26, SD = 1.05, α = .81), participants rated statements about how meritocracy was functioning in Singapore (e.g. "People who work hard *do* achieve success."). For prescriptive beliefs (M = 6.22, SD = 0.67, α = .79), participants rated statements based on how they thought meritocracy should function in Singapore (e.g. "People who work hard *should* achieve success."). All items were assessed on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The items were averaged within each scale, with higher values reflecting higher endorsement

of descriptive or prescriptive beliefs. The questions are presented in Appendix B.

Trait optimism. Trait optimism was measured as a covariate using the Life Orientation Test – Revised (Scheier, Carver, & Bridges, 1994). It consisted of six questions measuring optimism (e.g. "I'm always optimistic about my future") and four filler items. Participants rated the questions using a 5-point Likert scale (1 = *I disagree a lot*; 5 = *I agree a lot*). The responses for the items were averaged and higher values reflected higher levels of trait optimism (M = 3.14, SD = 0.82, α = .81). The questions can be found in Appendix C.

Better-than-Average Effect (BAE). The measure of BAE was adapted from Kurman (2003). Participants were asked to compare themselves with people of the same age, gender and background on six traits (i.e. intelligence, health, sociability, cooperation, honesty, and generosity). They rated the items based on a 9-point Likert scale (1 = *much below average*, 5 = *average*, to 9 = *much above average*). The responses for the items were averaged and higher values reflected higher tendency for BAE (M = 6.30, SD = 0.92, α = .66).

Holistic thinking tendency. Holistic thinking tendency was measured using the Analysis-Holism Scale (AHS; Choi, Koo, & Choi, 2007). The scale comprised four subscales: The Causality subscale (M = 5.24, SD = 0.77, α = .75) measured the likelihood that one would consider outcomes as a result of complex interactions between people and situations. The Attitude Towards Contradiction subscale (M = 4.93, SD = 0.89, α = .71) measured the tendency of individuals to accept and reconcile contradictions instead of resolving

contradictions by choosing one over the other; the Perception of Change subscale (M = 4.69, SD = 0.84, α = .70) examined if individuals expect change to follow a less predictable pattern instead of being stable or constant; the Locus of Attention subscale (M = 5.02, SD = 0.77, α = .69) measured the tendency of individuals to focus on the field instead of the parts. There were six items for each subscale, resulting in a total of 24 items. Participants rated the questions using a 5-point Likert scale (1 = *strongly disagree;* 7 = *strongly agree*). Ratings were also averaged across all items to compute the overall tendency for holistic thinking, where higher scores represent higher tendency for holistic thinking (M = 4.97, SD = 0.47, α = .72). The questions can be found in Appendix D.

General National Pride (GNP). GNP was used as a proxy to assess for enhancement bias for one's country. The questions were adapted from Smith & Kim (2006) and measured on a 5-point Likert scale (1= strongly disagree, 5= strongly agree). The responses for the items were averaged. Higher scores reflected higher national pride (M = 2.95, SD = 0.51, α = .44). GNP items can be found in Appendix E.

Objective social class indicators. Participants were asked to indicate their parents' occupation, parental level of education and monthly household income. The item for parents' occupation was open-ended, while response options were given for the other two items measuring parental level of education and household income. Level of education was measured based on nine categories according to Singapore Standard Educational Classification 2015: pre-primary, primary, secondary, post-secondary (non-tertiary), polytechnic diploma, professional qualification or other diploma, Bachelor's

or equivalent, postgraduate diploma or certificate qualification, Master's/PhD or other postgraduate degree. Parents' level of education was computed as the average rating for mother's and father's level of education (M = 5.16, SD = 1.94, r = .61, p < .001). 32% of mothers and 39% of fathers in our sample had an educational attainment of college and above.

On the other hand, monthly household income was measured using 10 categories (1 = Under $2,000; 2 = $2,001 - $3,000; 3 = $3,001 - $4,000; 4 = $4,001 - $5,000; 5 = $5,001 - $6,000; 6 = $6,001 - $7,000; 7 = $7,001 - $8,000; 8 = $8,001 – 9,000, 9 = $9,001 - $10,000, 10 = Over $10,000; M = 6.80, SD = 3.05).

Subjective social class. Subjective social class was assessed using MacArthur Scale of Subjective Status measure (Adler, Epel, Castellazzo, & Ickovics, 2000). Participants were shown a picture of a ladder and asked to rate about their rank on the ladder as compared to the general population in Singapore (M = 6.18, SD = 1.46) and within the university respectively (1 = *bottom*, 10 = *top;* M = 5.16, SD = 1.92).

Knowledge on social class issues. To check if participants' estimation of social mobility was correlated with their knowledge on social class issues (e.g. social inequality, social mobility) in Singapore, participants also rated their knowledge on this topic on a 5-point Likert scale (1 = *not knowledgeable at all*, 5 = *extremely knowledgeable;* M = 2.80, SD = 0.69).

Analytic Strategy

To test H1, a simple t-test was conducted to compare participants' estimations of intergenerational social mobility with the actual mobility statistics provided by Yip (n.d.) to assess if Singaporeans would overestimate

or underestimate social mobility. To test H2a, H2b and H2d, separate regression analyses were conducted in SPSS to assess if psychological factors such as self-enhancement, holistic thinking and social class would affect mobility estimates. To test H2c, Response Surface Analysis (RSA) was used to examine how congruence between prescriptive and descriptive meritocracy would influence mobility estimates. As the use of RSA is rather novel in psychology, the theory and analysis interpretation will be covered in brief in the next section. For H3, mediation analyses were done using SPSS PROCESS Macro version 3.3. Finally, to test H4, multilevel linear models were used to assess if the type of mobility estimates would moderate the relationship between social class and estimations of social mobility. A multilevel approach was required as all participants rated both types of social mobility. Consequently, the estimations for social mobility are nested within individuals. All coefficients in the model were assumed to be fixed.

Response Surface Analysis (RSA). To examine if belief congruence would affect accuracy of perception (i.e. H2c), RSA was used. As outlined by Humberg, Nestler, & Back (2018), RSA is the most appropriate analysis to determine if agreement between two psychological variables would negatively or positive affect the outcome variable (i.e. congruence effect). However, RSA cannot be used to determine how incongruent pairings of predictors would affect the outcome (Humberg et al., 2018). The analysis relies on a polynomial regression equation, where the outcome variable (Z) is predicted by the two psychological variables, X and Y, their squared terms and their interaction term (Equation 1).

$$Z = b_0 + b_1 X + b_2 Y + b_3 X^2 + b_4 XY + b_5 Y^2 \quad \text{(Equation 1)}$$

In the current paper, we were interested to examine if congruence between prescriptive meritocracy (X) and descriptive meritocracy (Y) would affect people's accuracy of intergenerational social mobility (Z). Plotting the polynomial regression equation would provide us with a surface plane on a three-dimensional coordinate system. If there is a significant congruence effect for H2c, the graph should take the shape of a saddle (see Figure 1a). If the level of X and Y congruent pairs also predicts Y, then the graph would be tilted along the Line of Congruence (LOC; see Figure 1b).

To assess if the congruence effect is significant, we need to first assess if the first principal axis coincides with the LOC. The first principal axis can be described as the "ridge" of the surface plane. When projected to the XY plane, the following equation can be used to describe the first principal axis:

$$Y = p_{10} + p_{11}X$$

On the XY plane, LOC can be expressed as the following:

$$Y = 0 + (1)X$$

Hence, if there is a congruence effect, we should expect $p_{10} \approx 0$ and $p_{11} \approx 1$.

In addition to assessing if the first principal axis coincides with LOC, a significant congruence effect also requires two further conditions to be met: 1) the surface above the Line of Incongruence (LOIC) to take on a U-shape or an inverted U-shape (i.e. a parabola) and 2) the maximum or minimum point of the U-shaped plane should be at the point where X and Y are both 0 (Barranti, Carlson, & Côté, 2017; Humberg et al., 2018). Condition 1 is met when $b_3 - b_4 + b_5$ from Equation 1 is significant. This term (i.e. $b_3 - b_4 + b_5$) is typically expressed as a_4. When a_4 is significantly negative, the surface above

the LOIC would present as an inverted U-shaped parabola, while a significantly positive a_4 would show a U-shaped parabola. On the other hand, Condition 2 is satisfied when $b_1 - b_2$ from Equation 1 is non-significant. The term $b_1 - b_2$ is typically expressed as a_3 in RSA.

In total, to assess if congruence between prescriptive meritocracy and descriptive meritocracy would affect people's accuracy of intergenerational social mobility, we require four conditions to be met. Namely, we would expect $p_{10} \approx 0$, $p_{11} \approx 1$, a non-significant a_3 and a significant a_4. As we hypothesized belief congruence to predict higher estimations, a_4 should be positively significant in our analysis. All four conditions will have to be supported in order to suggest a significant congruence effect in our analysis.

On top of assessing for a basic congruence effect, we also hypothesized a positive main effect of the predictors such that higher scores on both prescriptive and descriptive meritocracy would predict higher estimations as compared to lower scores on both. In mathematical terms, the main effect is assessed by the slope of LOC, provided by the term a_1 (i.e. $b_1 + b_2$ from Equation 1). If our hypothesis is supported, a_1 should be positively significant. The main effect of the predictors can only be assessed if the basic congruence effect is supported.

RSA will be performed using R (R Development Core Team, 2014) and the RSA package (Schönbrodt, 2015). All parameters required to assess for congruence effect were computed automatically using R.

Results

Descriptive Statistics

The means and standard deviations of all key variables were presented in Table 1. For all measures, the mean rating was computed for each participant. Correlations for all variables are presented in Table 2.

Estimations of Social Mobility

Participants provided estimations for both intergenerational and intragenerational social mobility. The estimations given for intergenerational social mobility (M = 45.02, SD = 19.19) was significantly higher than that given for intragenerational social mobility (M = 38.72, SD = 18.68), $t(250)$ = 5.47, $p < .001$, 95% CI [4.03, 8.57]. Estimations for the two mobility estimates were also moderately correlated, $r(249)$ = .80, $p < .001$, 95% CI [0.75, 0.84]. Participants' gender also did not significantly predict estimations of both intergenerational social mobility, β = .01, SE = .06, p = .83, 95% CI [-0.11, 0.14] and intragenerational social mobility, β = -.01, SE = 0.06, p = .90, 95% CI [-0.13, 0.12].

Since the order of response options was previously shown to affect mobility estimations (Davidai & Gilovich, 2018), we compared the mobility estimates by condition. For intergenerational social mobility, although participants in the mobility prime condition (M = 47.23, SD = 19.96) estimated the likelihood of upward social mobility to be higher than participants in the immobility prime condition (M = 42.93, SD = 18.26), this difference was non-significant, $t(249)$ = -1.78, p = .08, 95% CI [-9.05, 0.45]. Similarly for intragenerational social mobility, participants in the mobility prime condition (M = 38.97, SD = 17.72), and immobility prime condition (M

= 38.49, *SD* = 19.61) also did not differ significantly in their mobility estimations, $t(249) = -0.20$, $p = .84$, 95% CI [-5.13, 4.18]. Therefore, in the subsequent analyses, estimations of social mobility were collapsed across conditions.

RQ1: Would Singaporeans overestimate or underestimate upward intergenerational social mobility?

In this analysis, probability of intergenerational social mobility was computed as the total probability of moving up from the lowest quintile to the middle or higher quintile. According to the report by Singapore Ministry of Finance (Yip, n.d.), the actual probability was 54%. As compared to the actual statistics, the estimation given by our sample was significantly lower at 45%, *SD* = 19.19, $t(250) = -7.41$, $p < .001$, 95% CI [-11.37, -6.59], indicating that participants significantly underestimated intergenerational mobility. Estimates of intergenerational social mobility was not significantly correlated with participants' knowledge of social issues in Singapore, $r(249) = .11$, $p = .08$, 95% CI [-0.01, 0.23]. Therefore, H1 was supported.

RQ2: What are the psychological factors that would influence estimations of intergenerational social mobility?

Self-enhancement bias. We predicted that self-enhancement bias would increase estimations for intergenerational social mobility. Two types of self-enhancement bias were included in the current study: BAE and GNP. When both variables were included in a regression model to predict estimation of intergenerational social mobility, both BAE, $\beta = 0.20$, $SE = 0.07$, $p = .004$, 95% CI [0.70, 0.33], and GNP, $\beta = 0.16$, $SE = 0.07$, $p = .02$, 95% CI = [0.03,

0.29], were predictive of higher estimations.[1] As predicted in H2a, higher scores for BAE and GNP were associated with higher estimations for intergenerational social mobility.

Holistic thinking tendency. We predicted that greater tendency for holistic thinking would be associated with lower estimations for intergenerational social mobility. The total AHS score did not predict intergenerational social mobility estimates, β = 0.01, *SE* = 0.07, *p* = .83, 95% CI [-0.12, 0.15]. We also examined if the individual AHS subscales predicted mobility estimates in separate regression analyses. For estimations of intergenerational mobility, causality (β = 0.03, *SE* = 0.07, *p* = .65, 95% CI = -0.11, 0.17), attitude towards contradiction (β = 0.06, *SE* = 0.07, *p* = .38, 95% CI = -0.08, 0.20), attitude towards change (β = -0.06, *SE* = 0.07, *p* = .41, 95% CI = -0.20, 0.08) and locus of attention (β = -0.004, *SE* = 0.70, *p* = .96, 95% CI = -0.14, 0.13) did not significantly predict mobility estimates. Contrary to our hypothesis in H2b, the findings indicated that within-culture variations in holistic thinking styles did not predict perceptions of social mobility[2].

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[1] Auxiliary regression analyses were conducted with trait optimism included as a covariate. The results of the analyses were largely similar to the analysis reported in the main text. When the three variables were included in a regression model to predict estimation of intergenerational social mobility, both BAE, β = 0.20, *SE* = 0.07, *p* = .008, 95% CI [0.05, 0.35], and GNP, β = 0.16, *SE* = 0.07, *p* = .024, 95% CI [0.02, 0.30], remained significant. After including trait optimism as a covariate, higher scores for BAE and GNP remained associated with higher estimations for intergenerational social mobility.

[2] Including optimism as a covariate did not change the findings of analyses using AHS as predictor. The total AHS score still did not predict intergenerational social mobility estimates, β = 0.01, *SE* = 0.07, *p* = .87, 95% CI = [-0.13, 0.15]. The subscales in AHS, causality (β = 0.03, *SE* = 0.07, *p* = .68, 95% CI = -0.11, 0.17), attitude towards contradiction (β = 0.06, *SE* = 0.07, *p* = .42, 95% CI = -0.08, 0.19), attitude towards change (β = -0.05, *SE* = 0.07, *p* = .44, 95% CI = -0.19, 0.08), and locus of attention (β = -0.01, *SE* = 0.07, *p* = .93, 95% CI = -0.14, 0.13), remained non-significant in predicting estimations of intergenerational social mobility.

Belief congruence. The effect of belief congruence in meritocracy on estimations for social mobility was determined using Response Surface Analysis (RSA; Barranti et al., 2017; Humberg et al., 2018). Ratings for both prescriptive and descriptive beliefs were centered to the midpoint of the scale prior to entering into the polynomial regression equation for RSA. All coefficients from the polynomial regression model to predict estimations of intergenerational social mobility and RSA are presented in Table 3 and 4. The polynomial regression model accounted for 11.9% of the variance in intergenerational social mobility estimates.

We predicted that congruence between prescriptive and descriptive meritocratic beliefs would predict higher estimates for intergenerational social mobility. However, in our analysis, only three out of four conditions for congruence effect were met. First, the parameters showed that the first principal axis was not significantly different from LOC, As described in Methods, for the first principal axis to lie on LOC, p_{10} should approximate to 0 and p_{11} should approximate 1. According to our results, p_{10} was not significantly different from 0 (p_{10} = 18.04, p = .86, 95% CI = -181.48, 217.57) and p_{11} was not significantly different from 1 (p_{11} = -14.00, 95% CI = -178.76, 150.77), which indicated that the ridge of the surface was not significantly different from the LOC. However, the confidence intervals were too large to be conclusive. As seen in Figure 1, the first principal axis indicated by the black dotted line did not coincide with the Line of Congruence (LOC), as indicated by the vertical blue line. Hence, it was questionable if the conditions for congruence effect were met. Second, a_3 was also not significantly differently from 0 (a_3 = -3.01, p = .78, 95% CI = -24.14,

18.12), indicating that the surface plane was maximized at (0, 0). While this meets another condition for congruence effect, the confidence interval for a_3 was also too wide to be conclusive. Lastly, a_4 was non-significant (a_4 = -0.39, p = .91, 95% CI = -7.29, 6.52), suggesting that surface was not a parabola, and this did not meet the condition for congruence effect. As all conditions need to be satisfied in order to conclude a significant congruence effect, the current results did not support a congruence effect. In other words, belief congruence in prescriptive and descriptive meritocracy did not predict participants' perception of intergenerational social mobility. The response surface model can be found in Figure 2.

Social class. We examined if objective and subjective social class also predicted mobility estimates in separate regression models. We predicted that lower class individuals would perceive intergenerational social mobility to be lower, which would replicate findings from Davidai & Gilovich (2015). Our hypothesis was only supported by parents' level of education as predictor: lower parents' education was associated with higher estimations, β = -0.21, *SE* = 0.06, p < .001, 95% CI [-0.33, -0.09]. However, household income (β = -0.11, *SE* = 0.07, p = .11, 95% CI = -0.25, 0.03), subjective social class ranking in the university (β = -0.02, *SE* = 0.06, p = .78, 95% CI = -0.14, 0.11) and in Singapore (β = -0.05, *SE* = 0.06, p = .40, 95% CI = -0.18, 0.11) did not significantly predict estimations of intergenerational social mobility[3]. Hence, H2d was only partially supported.

[3]The findings were reproduced even when optimism was controlled for in the analyses. For estimations of intergenerational social mobility, higher parents' education predicted lower estimations, β = -0.21, *SE* = 0.06, p < .001, 95% CI [-0.33, -0.09]. However,

Additional analyses for intragenerational mobility estimates can be found in Appendix F. All findings for intergenerational mobility estimates were replicated for intragenerational mobility, with the exception of the lack of significant association between GNP and intragenerational social mobility estimates, β = 0.06, *SE* = 0.07, *p* = .37, 95% CI [-0.07, 0.20]. Higher GNP did not predict higher estimates for intragenerational mobility estimates but for intergenerational mobility estimates.

RQ3: Does congruence in beliefs about meritocracy mediate the effect of social class on perceptions of social mobility?

For the mediation analyses, belief congruence was operationalized as the absolute difference between prescriptive and descriptive meritocratic beliefs. Higher scores for belief congruence reflected a larger incongruence between the two types of beliefs, regardless of the direction of incongruence.

Parents' level of education as predictor. The direct effect of parents' level of education on intergenerational social mobility estimates was significant, β = -0.18, *t*(248) = -2.93, *p* = .004, 95% CI [-0.29, -0.06]. Parents' level of education was also significantly associated with belief congruence, β = 0.13, *t*(249)= 2.10, *p* = .04, 95% CI [0.01, 0.26]. The findings indicate that individuals with poorer educated parents are more likely to perceive intergenerational social mobility to be higher, even after controlling for belief congruence. Individuals with poorer educated parents were also more likely to have higher belief congruence. Consistent with our hypothesis, lower belief

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household income (β = -0.12, *SE* = 0.07, *p* = .09, 95% CI = -0.25, 0.02), subjective social class ranking in the university (β = -0.05, *SE* = 0.07, *p* = .42, 95% CI = -0.18, 0.08) and in Singapore (β = -0.08, *SE* = 0.06, *p* = .22, 95% CI = -0.21, 0.05) did not significantly predict estimations of intergenerational social mobility.

congruence was predictive of lower intergenerational mobility estimates, β = -0.29, $t(248) = -4.79$, $p < .001$, 95% CI [-0.40, -0.17]. The indirect effect of parents' education on intergenerational mobility estimates via belief congruence was significant, β = -0.04, *SE* = 0.02, 95% CI [-0.08, -0.002]. The negative relationship between parents' level of education and intergenerational social mobility estimates was partially mediated by belief congruence.

Household income as predictor. The direct effect of household income on intergenerational mobility estimates was non-significant, β = -0.11, $t(203) = -1.62$, $p = .11$, 95% CI [-0.24, 0.02]. Household income was not associated with intergenerational mobility estimates after controlling for belief congruence. Household income was also not associated with belief congruence, β = 0.02, $t(204) = 0.25$, $p = .80$, 95% CI [-0.12, 0.16]. On the other hand, similar to previous analyses, lower belief congruence was predictive of lower intergenerational mobility estimates, β = -0.28, $t(203) = -4.26$, $p < .001$, 95% CI [-0.42, -0.15]. As household income was not associated with belief congruence, the indirect effect of monthly household income on intergenerational mobility estimates via belief congruence was non-significant, β = -0.005, *SE* = 0.02, 95% CI [-0.05, 0.04]. Together, the findings suggest that belief congruence was not a mediator in the association between household income and intergenerational social mobility estimates.

Subjective social class (university) as predictor. There was no significant direct effect of subjective social class in the university and intergenerational mobility estimates, β = -0.03, $t(248) = -0.57$, $p = .57$, 95% CI [-0.15, 0.08]. Controlling for belief congruence, subjective social class (university) was not associated with intergenerational social mobility

estimates. Subjective social class (university) was also not associated with the absolute difference between prescriptive and descriptive meritocratic beliefs, β = -0.05, $t(249) = -0.82$, $p = .41$, 95% CI [-0.18, 0.07], suggesting that belief congruence does not mediate between subjective social class and intergenerational social mobility estimates. In this analysis, higher belief congruence also predicted higher intergenerational social mobility, β = -0.31, $t(248) = -5.16$, $p < .001$, 95% CI [-0.43, -0.19], controlling for subjective social class (university). However, because subjective social class (university) was not associated with belief congruence, the hypothesized mediation pathway was not supported, β = 0.02, $SE = 0.02$, 95% CI [-0.03, 0.06].

Subjective social class (country) as predictor. There was no significant direct effect of subjective social class in the country and intergenerational mobility estimates, β = -0.05, $t(248) = -0.90$, $p = .37$, 95% CI [-0.17, 0.06]. Controlling for belief congruence, there was no association between subjective social class in the country and intergenerational mobility estimates. Subjective social class (country) was also not associated with the absolute difference between prescriptive and descriptive meritocratic beliefs, β = -0.004, $t(249) = -0.06$, $p = .95$, 95% CI [-0.13, 0.12]. On the other hand, belief congruence was positively associated with intergenerational social mobility while controlling for subjective social class (country), β = -0.31, $t(248) = -5.15$, $p < .001$, 95% CI [-0.43, -0.19]. Higher belief congruence predicted higher intergenerational social mobility estimates. However, as subjective social class (country) did not predict difference in belief congruence, the indirect pathway was non-significant, β = 0.001, $SE = 0.02$,

95% CI [-0.04, 0.04][4]. The association between subjective social class (country) and intergenerational social mobility estimates was not mediated by belief congruence.

The mediation analyses were conducted for estimates of intragenerational social mobility as well. There was no difference in the findings for estimates of intragenerational social mobility. The results of the mediation analyses can be found in Appendix F.

RQ4: Would the type of mobility estimate moderate the relationship between social class and estimations of social mobility?

Parents' level of education as social class predictor. Significant main effects were observed for both parents' level of education, $F(1,499) = 28.43$, $p < .001$ and the type of mobility measure, $F(1,499) = 14.65$, $p < .001$. Lower parents' level of education was observed to predict higher estimates, $\beta = -0.23$, $SE = 0.04$, $t(499) = -5.33$, $p < .001$, 95% CI [-0.31, -0.14], as well as the intergenerational mobility measure, $\beta = 0.33$, $SE = 0.09$, $p < .001$, $t(499) = 3.83$, 95% CI [0.16, 0.50], when compared to intragenerational mobility. However, the interaction between parents' level of education and the type of mobility measure was non-significant, $F(1,498) = 0.13$, $p = .72$. Hence, contrary to hypothesis, the type of mobility estimates did not moderate the association between parents' level of education and social mobility estimations.

Household income as social class predictor. Significant main effects were observed for both household income, $F(1,409) = 4.03$, $p = .045$, and the

[4] Due to an unresolved programming error in the Process macro reported by Hayes (n.d), the estimates for the indirect pathway were derived from a separate analysis using unstandardized variables in Process.

type of mobility measure, $F(1,409) = 12.08$, $p = .001$. Lower household income was observed to predict higher estimates, $\beta = -0.10$, $SE = 0.05$, $t(408) = -2.01$, $p = .045$, 95% CI [-0.19, -0.002], as well as the intergenerational mobility measure, $\beta = 0.34$, $SE = 0.10$, $t(409) = 3.47$, $p = .001$, 95% CI [0.15, 0.53], when compared to intragenerational mobility. However, the interaction between household income and the type of mobility measure was non-significant, $F(1,408) = .11$, $p = .74$. The type of mobility estimates did not moderate the association between household income and social mobility estimations.

Subjective social class (university) as predictor. Significant main effects were observed only for type of mobility measure, $F(1,499) = 13.88$, $\beta = 0.33$, $SE = 0.09$, $t(499) = 3.73$, $p < .001$, 95% CI [0.16, 0.50], but not for subjective social class (university), $F(1,499) = 0.86$, $\beta = -0.04$, $SE = 0.04$, $t(499) = -0.93$, $p = .35$, 95% CI [-0.13, 0.05]. Intergenerational social mobility was associated with higher estimates as compared to intragenerational social mobility. There was no significant association between subjective social class (university) and estimates. The interaction between social class (university) and the type of mobility measure was non-significant, $F(1,498) = 0.27$, $p = .60$, suggesting that the type of mobility estimates did not moderate the association between subjective social class ranking (university) and social mobility estimations.

Subjective social class (country) as predictor. The findings for the analysis using social class (country) mirrors the findings found using subjective social class (university). Significant main effect was observed only for type of mobility measure, $F(1,499) = 13.92$, $p < .001$. Similar to the

previous analyses, intergenerational mobility measure were estimated higher as compared to intragenerational mobility, β = 0.33, *SE* = 0.09, *t*(499) = 3.73, *p* < .001, 95% CI [0.16, 0.50]. On the other hand, subjective social class (country) was not associated with estimates, *F*(1,499) = 2.16, β = 0.06, *SE* = 0.04, *t*(499) = -1.47, *p* = .14, 95% CI [-0.15, 0.02]. The interaction between social class (country) and the type of mobility measure was also non-significant, *F*(1,498) = 0.07, *p* = .80.

In summary, the current findings did not find any support for the hypothesis that the type of mobility measures moderate the effect of social class on estimates.

Discussion

The current research was a replication and extension of the previous works on how people perceive social mobility. First, the current research re-examined the question of whether individuals tend to overestimate or underestimate social mobility, using a non-Western and culturally interdependent sample that has received little attention in the existing literature. Second, the current research also explored the influence of additional and novel psychological factors on people's perceptions of social mobility, namely self-enhancement bias, holistic thinking and belief congruence in prescriptive and descriptive meritocratic beliefs. Finally, the current research sought to reconcile the conflicting findings from Davidai & Gilovich (2015) and Kraus & Tan (2015) on the influence of social class on the perception of different types of social mobility by testing how congruence in meritocratic beliefs mediated the relationship, and whether the relationship also differed by the type of mobility measures.

RQ 1: Would Singaporeans overestimate or underestimate upward intergenerational social mobility in Singapore?

Our findings suggest that unlike Americans, Singaporean undergraduates underestimated intergenerational social mobility. This finding appeared to be consistent with our reasoning that individuals from interdependent cultures would perceive lower social mobility due to lower self-enhancement bias (Falk et al., 2009; Hamamura et al., 2007; Heine & Hamamura, 2007; Heine & Lehman, 1997) and greater emphasis on contextual information (Choi et al., 1999; Ji et al., 2000; Kitayama et al., 2003). The current finding of underestimation in Singaporean undergraduates provides some indication that cultural influences might play a role in shaping our perception of social mobility.

A possible alternative explanation for this finding of underestimation could be that undergraduate students underestimate social mobility because they are less knowledgeable about social class mobility issues. In other words, the underestimation reflects general estimation errors rather than psychologically motivated underestimations. To examine this possibility, we tested if participants' reports of their level of knowledge on social class issues predicted differences in their estimations. We found that level of knowledge did not significantly predict estimations, $\beta = 0.11$, $SE = 0.06$, $p = .08$, 95% CI [-0.01, 0.24], ruling out the possibility that the underestimations were merely general estimation errors.

RQ2: What are the Psychological Factors that would Influence Perceptions of Intergenerational Social Mobility?

Three main potential factors were examined in the current study: culture (i.e. BAE, GNP), belief congruence and social class.

Cultural factors. We proposed that the difference between how Singaporeans and Americans perceive intergenerational social mobility in their countries might be due to cultural differences in self-enhancement and holistic thinking tendency. We predicted that even within-culture, higher self-enhancement bias and lower tendency for holistic thinking would also increase estimates for intergenerational social mobility. As expected, higher BAE and GNP was predictive of higher estimations, supporting our hypothesis that differences in self-enhancement tendencies were involved in our perception of social mobility.

The current finding that self-enhancement bias is a significant predictor of perceptions of social mobility raises the interesting possibility that people who reported higher perceptions of social mobility might merely be managing impressions of their country. Specifically, people might report higher social mobility and lower motivation towards social reforms because of they want to create a good impression of their society. On the other hand, self-enhancement bias might also have a positive effect on participation rates for civic engagement and social activism. For example, people who tend to inflate their evaluation of themselves and their country might also be more optimistic in their ability to effect social change. Although the deeper psychological process underlying self-enhancement bias is beyond the scope of this research,

future work could examine the various cognitions and motivations that might explain the role of self-enhancement in biasing mobility estimates.

For holistic thinking, we initially theorized that Singaporeans with a higher tendency for holistic thinking would provide lower estimates for social mobility because of the general climate of pessimism regarding income inequality and social mobility in Singapore. However, the current findings did not find any support for the link between holistic thinking and perception of social mobility. The lack of association could be due to actual heterogeneity in participants' contextual knowledge of social mobility in Singapore, as opposed to a general pessimistic outlook. To test this possibility, we examined the interaction effect of AHS total score and descriptive meritocracy on intergenerational mobility estimates. Individuals with higher tendency for holistic thinking are more likely to be sensitive to differences in descriptive meritocracy, a type of contextual information about how well meritocracy is currently working in the society, when making their estimations. We predicted that for individuals high in holistic thinking, higher descriptive meritocracy would predict higher estimates, while for individuals low in holistic thinking, descriptive meritocracy would not predict differences in estimates. However, this interaction effect was non-significant, $\beta = -0.05$, $SE = 0.07$, $p = .47$, 95% CI [-0.19, 0.09], suggesting that people's perception of social mobility might be largely independent of holistic thinking styles.

Belief congruence. Contrary to our hypothesis, congruence in meritocratic beliefs was not predictive of higher estimates for either measures of social mobility when we used RSA to analyze the data. We had hypothesized that higher congruence between prescriptive and descriptive

meritocracy would predict higher estimations because belief congruence was associated with the perceived legitimacy of the system (Zimmerman & Reyna, 2013). The lack of support for this hypothesis might be due to a ceiling effect on the measurement of prescriptive meritocracy. On average, endorsements for prescriptive meritocratic beliefs, assessed on a seven-point scale, among participants were high (M = 6.22, *SD* = 0.67) whereas endorsements for descriptive meritocratic beliefs were closer to mid-point (M = 4.26, *SD* = 1.05), suggesting that there may be significantly more cases of incongruent than congruent belief pairings. In addition, the direction of incongruence would be predominantly be in the same direction (i.e. high prescriptive beliefs and low descriptive beliefs). The low frequency of congruent pairings and incongruent pairings of high descriptive meritocracy and low prescriptive beliefs would affect whether RSA can be conducted meaningfully (Humberg et al., 2018).

Nonetheless, our hypothesis for belief congruence was supported when belief congruence was operationalized as the absolute difference between prescriptive and descriptive meritocracy, where a higher score represents lower belief congruence. Using regression analyses, belief congruence significantly predicted both intergenerational, β = -0.31, *SE* = 0.06, $p < .001$, 95% CI [-0.43, -0.19], and intragenerational social mobility estimates, β = -0.24, *SE* = 0.06, $p < .001$, 95% CI [-0.36, -0.12], such that higher belief congruence was associated with higher mobility estimates. This is consistent with our reasoning that congruence between prescriptive and descriptive meritocracy, which reflects the perceived legitimacy of the system (Zimmerman & Reyna, 2013), should predict higher mobility estimates.

Social class. Lastly, for social class indicators, only parents' level of education was negatively associated with both mobility estimates in the current study. This finding is consistent with past findings that lower-class individuals (e.g. less educated, lower-income earners) estimate higher intergenerational social mobility (Alesina et al., 2018; Davidai & Gilovich, 2015). Another possibility is that participants with less educated parents had experienced upward social mobility in terms of education. In our sample, about two-thirds of parents did not receive college education, which also means that two-thirds of our participants attained higher educational levels than their parents. Hence, undergraduates with parents who are less educated may perceive higher social mobility in Singapore due to their personal experiences of upward social mobility.

However, our findings also differ from past findings in that we did not find any significant effect of household income on estimates. This non-significant finding could be due to the restricted range of income provided for participants. 33.5% of the participants who answered the question on monthly household income reported a monthly household income that was above $10,000 (i.e. the top category), resulting in a ceiling effect. Hence, the current measure of household income does not adequately capture the complete distribution. The problem of restricted range in the sample might also be exacerbated by the possibility that our participants are college students who come from wealthier family backgrounds compared to the average population.

Another reason for the lack of significant influence of household income and subjective social class might be due to the operationalization of social class for undergraduate samples. The lack of significant associations

between social class and mobility estimates among undergraduates was reported in Kraus & Tan (2015) as well, although they found significant associations for adults. Together with the current study, these findings collectively suggest that social class as operationalized by household income and subjective social status may be a less powerful predictor for undergraduates as they have yet to internalize or formalize their social class status. Future studies should measure household income using a wider range of income categories, as well as employ a more representative sample of Singaporeans to determine if perception of social mobility vary by income and subjective social class.

Differences in findings for intergenerational and intragenerational social mobility estimates. The findings for intergenerational and intragenerational social mobility estimates were largely similar, with the exception of GNP as a predictor. GNP was associated with estimates intergenerational social mobility but not for intragenerational social mobility. One possibility is that the mean value of intergenerational mobility estimates was generally low, resulting in a lower standard deviation of the mobility estimates that may have suppressed potential associations with GNP. Another reason may be due to how the two type of mobility are assessed in the current study. For the same target person (i.e. random Singaporean aged between 25 and 35), the estimation of intergenerational social mobility required participants to estimate the social class of the target person now, whereas for intragenerational social mobility, participants would have to estimate the person's social class 10 years from now. In other words, when estimating intergenerational social mobility, participants are likely to base their

estimation on a past event, while for intragenerational social mobility, participants would have to base their estimations on a future event. Similar to perception of intergenerational social mobility, feelings of national pride are also likely to be based on the country's past and current achievements instead of the future. Hence, GNP might have a weaker association with intragenerational social mobility because a different reference time frame.

RQ3: Does Congruence in Beliefs About Meritocracy Mediate the Effect of Social Class on Perceptions of Social Mobility?

According to our data, the effect of parents' level of education on both intergenerational and intragenerational social mobility was mediated by belief congruence. Low parents' level of education was associated with higher estimations for social mobility through higher levels of belief congruence. Our findings support the speculation by Davidai & Gilovich (2015) that lower-class individuals would estimate higher social mobility because they would be more motivated to believe in a fair system which they can advance in.

Although our hypothesis was supported, our findings differ from research that found that lower-class individuals had lower belief congruence than upper-class individuals (Zimmerman & Reyna, 2013). This discrepancy in findings suggest that the different social class indicators may have different impact on belief congruence. In the research done by Zimmerman & Reyna (2013), they assessed social class using household income and subjective social class. As reasoned by Zimmerman & Reyna (2013), upper-class individuals with high income or high subjective social class might have lower awareness about social disparities because they are less likely to be personally affected by unfulfilled ideals of equality or meritocracy, which results in

higher belief congruence. For lower-class individuals, as they have less resources to buffer against the drawbacks of an imperfect system, their perception of descriptive meritocracy would be likely be lower, resulting in a lower congruence between descriptive and prescriptive meritocratic beliefs. However, our data suggest that higher social class, as indicated by higher level of parental education, may mean that individuals are more exposed to discourses on social issues and disparities. Consequently, individuals with more educated parents may be more aware of the complexities surrounding social mobility issues, which would increase the discrepancy between prescriptive and descriptive meritocracy (i.e. lower belief congruence).

Although we found that lower-class individuals, as determined by parents' level of education, made higher social mobility estimates because of higher belief congruence, a further explanation may be that higher belief congruence among lower-class individuals may be accompanied by higher satisfaction with society. As satisfaction with society was measured in the current study as an exploratory measure, we were able to test this possibility. Nonetheless, despite a positive correlation between belief congruence and satisfaction with society, $r(204) = .30$, $p < .001$, the effect of social class on social mobility estimates was not mediated by satisfaction with society. Specifically, parents' level of education did not predict participants' satisfaction with society, $\beta = 0.007$, $t(204) = 0.09$, $p = .93$, 95% CI [-0.13, 0.14], and participants' satisfaction with society was also not associated with perception of intergenerational social mobility, $\beta = 0.04$, $t(203) = 0.61$, $p = .54$, 95% CI [-0.09, 0.17], after controlling for parents' level of education. Consequently, the indirect effect of parents' level of education on perceptions

of intergenerational social mobility was non-significant, β = 0.003, *SE* = 0.01, 95% CI [-0.01, 0.01]. This suggests that the motivations of lower-class individuals to believe that the current system is fair and social mobility is high, is independent of whether they feel more satisfied with the state of society. The questions used to measure satisfaction with society can be found in Appendix G.

RQ4: Would the Type of Mobility Estimate Moderate the Relationship Between Social Class and Estimations of Social Mobility?

Across all analyses, the association between social class indicators and estimates was not dependent on the type of mobility estimates. The lack of significant moderation effects could be due to the within-subject design of the current study. As participants answer questions on both intergenerational and intragenerational social mobility, the estimates for the two measures would be more highly correlated as compared to a between-subjects design where participants only have to estimate one type of social mobility. Another reason could be due to the lack of life experiences amongst undergraduates to differentiate between their perceptions of intergenerational and intragenerational social mobility.

For all of the analyses conducted to address this question, there was no main effect of social class indicators, except for parents' level of education. Similar to the analysis reported above, parents' level of education was negatively associated with mobility estimates, regardless of the type of mobility estimates. Although Kraus & Tan (2015) found that upper-class individuals estimated intragenerational social mobility to be higher, the finding was not replicated in the current study.

We also observed a main effect of mobility type on estimates across the analyses. Regardless of social class, individuals estimated intergenerational social mobility in Singapore to be higher as compared to intragenerational social mobility. This finding could be reflecting the opinion that it is increasingly difficult to attain social mobility in Singapore (Tan, 2015). As mentioned earlier, our measure of intergenerational social mobility is based on the present/past whereas our measure of intragenerational social mobility is based on the future. Hence, the difference between the two mobility measures might be confounded by the different reference period.

Limitations and Future Research

One limitation of the current study was the lack of control over the information that participants used to assess social mobility. Although we did not find support for the role of holistic thinking in influencing perception of social mobility, it is possible that this is due to participants using different information to estimate social mobility. For instance, participants might be thinking of social inequality, social welfare policies, an actual person who belonged to the poorest 20% of society, or their own experiences of social mobility. Depending on the content of information that used, the tendency to think holistically might influence mobility estimates in either direction, resulting in the non-significant findings observed in the current study. Future research can consider manipulating the type of information given to participants and test if the effect of information provided on mobility estimates would differ depending on individual differences in analytic or holistic thinking styles. If the moderation hypothesis is supported, this line of research

can provide insight on how news or public announcement can influence public perceptions differently in different cultures.

As the study was conducted using an undergraduate sample, findings might not be generalizable to Singaporeans in general. First of all, undergraduates have limited working experience and might be unfamiliar with how people can attain upward social mobility, other than through academic achievements. Undergraduates also tend to come from middle-class families and might have limited exposure to individuals who come from the lowest income quintile of society. Undergraduates' limited exposure to the poor might bias their responses in ways that differ from the general population. For example, undergraduates might hold stronger negative stereotypes towards the poor (e.g. lazy) and underestimate their likelihood of social mobility. Expanding the current study to include a representative sample of Singaporeans would increase our confidence of generalizing our findings.

In addition, estimating the social mobility of someone who is in the poorest 20% of society might present a confound. For upper-class individuals, they would be estimating the social mobility for someone from a different social class, while for lower-class individuals, they would be estimating the social mobility of someone who is more similar to them. As people tend to estimate higher upward social mobility for people who are similar to them (Kraus & Tan, 2015), the findings of the current study could be replicating the effect of self-relevancy instead of social class difference. Future research can extend the current study to explore how the effect of social class on perception of social mobility might differ depending on the social class of the target

person. This line of research is likely to also provide insight on the extent of essentialist beliefs held by people of different social class.

The present study also did not examine the consequences of underestimating social mobility. Previous research showed that having a pessimistic view of social mobility lowered academic intentions and outcomes for low-status students, but not for high-status students (Browman et al., 2017; Browman, Svoboda, & Destin, 2019). This suggests that the negative effects of underestimating social mobility might disproportionately affect lower class individuals. For example, at the individual level, lower perception of social mobility might influence lower-class individuals to set lower career goals or underestimate their employability. At the societal level, underestimating social mobility might be beneficial instead. Past research has shown that manipulating lower perception of social mobility increases support for social reforms that would reduce economic inequality (Day & Fiske, 2017; Shariff et al., 2016). While social reforms might be desirable, overly pessimistic sentiments regarding social mobility can also disrupt sociopolitical stability and incur disproportionate societal costs. In order for governments to better manage public sentiments and social needs, more research is needed to better understand factors that undermine people's perception of social mobility.

Lastly, in the present study, we investigated how within-culture differences in self-enhancement bias and holistic thinking would affect perceptions of social mobility. While we found evidence supporting the role of self-enhancement bias in the perception of social mobility, we caution against making direct cross-culture inferences from these findings due to the lack of a true cross-cultural comparison. To better elucidate the cultural differences in

perception of social mobility and the underlying mechanisms, future research should include participants from two different cultures to enable a true cross-cultural comparison. Other than self-enhancement bias and holistic thinking, future studies can also consider the influence of power distance in determining perception of social mobility across cultures. Power distance is defined as the extent to which lower-status individuals accept and expect power to be distributed unequally (Hofstede, 2010). Cultures with high power distance, such as Singapore, are likely to have lower estimations of social mobility as inequality is deemed more acceptable.

Conclusion

The current research examined people's perceptions of social mobility in a non-Western cultural context and found that Singaporean undergraduates did not overestimate intergenerational social mobility like Americans do. Instead, we found that participants underestimated intergenerational social mobility. The current study provided preliminary support that cultural differences such as self-enhancement bias might account for cross-culture differences in perceptions of social mobility. Overall, the current research extends from past work by providing initial evidence for how different psychological factors and mechanisms underlie perceptions of social mobility. As it stands, more follow-up research is needed to corroborate with and generalize the current findings.

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology*, *19*(6), 586–592. https://doi.org/10.1037/0278-6133.19.6.586

Alesina, A., Stantcheva, S., & Teso, E. (2018). Intergenerational mobility and preferences for redistribution. *American Economic Review*, *108*(2), 521–554. https://doi.org/10.1257/aer.20162015

Chambers, J. R., Swan, L. K., & Heesacker, M. (2015). Perceptions of U.S. social mobility are divided (and distorted) along ideological lines. *Psychological Science*, *26*(4), 413–423. https://doi.org/10.1177/0956797614566657

Chetty, R., Hendren, N., Kline, P., Saez, E., & Turner, N. (2014). The equality of opportunity project — Online Data Table 1: National 100 by 100 transition matrix. Retrieved from http://www.equality-of-opportunity.org/index.php/data

Choi, I., Koo, M., & Choi, J. A. (2007). Individual Differences in Analytic Versus Holistic Thinking. *Personality and Social Psychology Bulletin*, *33*(5), 691–705. https://doi.org/10.1177/0146167206298568

Choi, I., Nisbett, R. E., & Norenzayan, A. (1999). Causal Attribution Across Cultures: Variation and Universality. *Psychological Bulletin,* 125(1), 47–63.

Davidai, S., & Gilovich, T. (2015). Building a more mobile America—One income quintile at a time. *Perspectives on Psychological Science*, *10*(1), 60–71. https://doi.org/10.1177/1745691614562005

Davidai, S., & Gilovich, T. (2018). How should we think about Americans' beliefs about economic mobility? *Judgment and Decision Making*, *13*(2), 297–304.

Day, M. V., & Fiske, S. T. (2017). Movin' on up? How perceptions of social mobility affect our willingness to defend the system. *Social Psychological and Personality Science*, *8*(3), 267–274. https://doi.org/10.1177/1948550616678454

Falk, C. F., Heine, S. J., Yuki, M., & Takemura, K. (2009). Why do Westerners self-enhance more than East Asians? *European Journal of Personality*, *23*(3), 183–203. https://doi.org/10.1002/per.715

Hamamura, T., Heine, S. J., Takemoto, T. R., & S. (2007). Why the better-than-average effect is a worse-than-average measure of self-enhancement: An investigation of conflicting findings from studies of East Asian self-evaluations. *Motivation and Emotion*; New York, 31(4), 247–259. http://dx.doi.org.libproxy.smu.edu.sg/10.1007/s11031-007-9072-y

Haslam, N., Bastian, B., Bain, P., & Kashima, Y. (2006). Psychological Essentialism, Implicit Theories, and Intergroup Relations. *Group Processes & Intergroup Relations*, *9*(1), 63–76. https://doi.org/10.1177/1368430206059861

Hayes, A. (n.d.). FAQ -The PROCESS macro for SPSS and SAS. Retrieved August 15, 2019, from The PROCESS macro for SPSS and SAS website: http://processmacro.org/faq.html

Hayes, A. (2017). *Introduction to mediation, moderation, and conditional process analysis, second edition : A regression-based approach*. New York: Guilford Publications.

Heine, S. J., & Hamamura, T. (2007). In search of East Asian self-enhancement. *Personality and Social Psychology Review*, *11*(1), 4–27. https://doi.org/10.1177/1088868306294587

Heine, S. J., & Lehman, D. R. (1995). Cultural variation in unrealistic optimism: Does the West feel more vulnerable than the East? *Journal of Personality and Social Psychology*, *68*(4), 595–607. https://doi.org/10.1037/0022-3514.68.4.595

Heine, S. J., & Lehman, D. R. (1997). The cultural construction of self-enhancement: An examination of group-serving biases. *Journal of Personality and Social Psychology*, *72*(6), 1268–1283. https://doi.org/10.1037/0022-3514.72.6.1268

Hofstede, G., Hofstede G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind.* Revised and Expanded 3rd Edition. New York: McGraw-Hill.

Humberg, S., Nestler, S., & Back, M. D. (2018). Response surface analysis in personality and social psychology: Checklist and clarifications for the case of congruence hypotheses. *Social Psychological and Personality Science*, 1-11. https://doi.org/10.1177/1948550618757600

Ji, L.-J., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology*, *78*(5), 943–955. https://doi.org/10.1037/0022-3514.78.5.943

Kitayama, S., Duffy, S., Kawamura, T., & Larsen, J. T. (2003). Perceiving an object and its context in different cultures: A cultural look at new look. *Psychological Science*, *14*(3), 201–206. https://doi.org/10.1111/1467-9280.02432

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review*, *119*(3), 546–572. https://doi.org/10.1037/a0028756

Kraus, M. W., & Tan, J. J. X. (2015). Americans overestimate social class mobility. *Journal of Experimental Social Psychology*, *58*, 101–111. https://doi.org/10.1016/j.jesp.2015.01.005

Kurman, J. (2003). Why is self-enhancement low in certain collectivist cultures?: An investigation of two competing explanations. *Journal of Cross-Cultural Psychology*, *34*(5), 496–510. https://doi.org/10.1177/0022022103256474

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Masuda, T., Ellsworth, P. C., Mesquita, B., Leu, J., Tanida, S., & Van de Veerdonk, E. (2008). Placing the face in context: Cultural differences in the perception of facial emotion. *Journal of Personality and Social*

Psychology, *94*(3), 365–381. https://doi.org/10.1037/0022-3514.94.3.365

Nero, S. S., Swan, L. K., Chambers, J. R., & Heesacker, M. (2018). Still no compelling evidence that Americans overestimate upward socio-economic mobility rates: Reply to Davidai & Gilovich (2018). *Judgment and Decision Making*, *13*(3), 305–308.

Norenzayan, A., Incheol Choi, & Richard E. Nisbett. (2002). Cultural similarities and differences in social inference: Evidence from behavioral predictions and lay theories of behavior. *Personality and Social Psychology Bulletin*, *28*(1), 109–120. https://doi.org/10.1177/0146167202281010

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310.

Paulo, D. A., & Low, M. (2018, October 1). Class – not race nor religion – is potentially Singapore's most divisive fault line. *Channel News Asia*. Retrieved from https://www.channelnewsasia.com/news/cnainsider/regardless-class-race-religion-survey-singapore-income-divide-10774682

Pew Research Center. (2012). Economic mobility in the United States. Retrieved from http://www.pewtrusts.org/ ~/media/assets/2015/07/fsm-irs-report_artfinal.pdf

Richard, F. D., Bond, C. F. J., & Stokes-Zoota, J. J. (2003). One hundred years of social psychology quantitatively described. *Review of General Psychology*, *7*(4), 331–363. https://doi.org/10.1037/1089-2680.7.4.331

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Revised Life Orientation Test. *PsycTESTS*. https://doi.org/10.1037/t09267-000

Shariff, A. F., Wiwad, D., & Aknin, L. B. (2016). Income mobility breeds tolerance for income inequality: Cross-national and experimental evidence. *Perspectives on Psychological Science*, *11*(3), 373–380. https://doi.org/10.1177/1745691616635596

Singapore Department of Statistics (2018). *Mean years of schooling, annual* Data file. Retrieved from https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=12097

Smith, T. W., & Kim, S. (2006). National pride in comparative perspective: 1995/96 and 2003/04. *International Journal of Public Opinion Research*, *18*(1), 127–136. https://doi.org/10.1093/ijpor/edk007

Swan, L. K., Chambers, J. R., Heesacker, M., & Nero, S. S. (2017). How should we measure Americans' perceptions of socio-economic mobility? *Judgment and Decision Making*, *12*(5), 507–515.

Tan, E. S. (2015). Social mobility in Singapore. In *50 years of social issues in Singapore* (pp. 119–132). World Scientific Publishing.

The World Bank. (2017). *GDP per capita (current US$)* Data file. Retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?view=map

The World Bank, World Development Indicators. (2016). *GINI index, World Bank Estimate* Data file. Retrieved from https://data.worldbank.org/indicator/SI.POV.GINI

Vannette, D. (2017). Using attention checks in your surveys may harm data quality. Retrieved December 6, 2018, from https://www.qualtrics.com/blog/using-attention-checks-in-your-surveys-may-harm-data-quality/

Widening wealth gap a Singaporean worry. (n.d.). Retrieved September 9, 2019, from https://www.blackbox.com.sg/2018/03/29/widening-wealth-gap-a-singaporean-worry/

Yip, C. S. (n.d.). *Intergenerational income mobility in Singapore*. Ministry of Finance, Singapore. Retrieved from https://www.mof.gov.sg/Portals/0/Feature%20Articles/IG%20Income%20Mobility%20In%20Spore.pdf

Zimmerman, J. L., & Reyna, C. (2013). The meaning and role of ideology in system justification and resistance for high- and low-status people. *Journal of Personality and Social Psychology*, *105*(1), 1–23. https://doi.org/10.1037/a0032967

Appendix A

Questions to measure upward intergenerational and intragenerational social mobility (adapted from Davidai & Gilovich, 2015)

Question for Intergenerational Mobility

Estimate the chances that the income of a Singaporean picked at random (aged between 25 to 35) would differ from that of **his or her PARENTS' INCOME**. More specifically, when answering this question, imagine that we took a person born to a family in the **poorest 20% of the population** at random.

What is the likelihood that such a person would be in each of the following income groups as an adult? (Total must add up to 100)

|---|---|---|---|---|
Poorest 20% | Second poorest 20% | Middle 20% | Second richest 20% | Richest 20%

Likelihood of a **person born to a family in the poorest 20%** remaining (as an adult) in the **poorest 20%**	0
Likelihood of a **person born to a family in the poorest 20%** rising (as an adult) to the **second poorest 20%**	0
Likelihood of a **person born to a family in the poorest 20%** rising (as an adult) to the **middle 20%**	0
Likelihood of a **person born to a family in the poorest 20%** rising (as an adult) to the **second richest 20%**	0
Likelihood of a **person born to a family in the poorest 20%** rising (as an adult) to the **richest 20%**	0
Total	0

Question for Intragenerational Mobility

Estimate the chances that the income of a Singaporean (aged between 25 to 35) picked at random would differ from that of **his or her OWN INCOME in ten years**. When answering this question, imagine that we took a person who belongs to the **poorest 20% of the population** at random.

What is the likelihood that such a person would be in each of the following income groups in ten years? (Total must add up to 100)

Poorest 20%	Second poorest 20%	Middle 20%	Second richest 20%	Richest 20%

Likelihood of a **person in the poorest 20%** remaining in the **poorest 20% in ten years**	0
Likelihood of a **person in the poorest 20%** rising to the **second poorest 20% in ten years**	0
Likelihood of a **person in the poorest 20%** rising to the **middle 20% in ten years**	0
Likelihood of a **person in the poorest 20%** rising to the **second richest 20% in ten years**	0
Likelihood of a **person in the poorest 20%** rising to the **richest 20% in ten years**	0
Total	0

Appendix B

Meritocratic Beliefs Scale (adapted from Zimmerman & Reyna, 2013)

Descriptive Meritocracy Scale

1. People who work hard do achieve success.
2. If people work hard they do get what they want.
3. With hard work, ethnic minorities are able to climb the ladder of success just as much as Chinese.
4. Discrimination does not prevent minority groups from getting ahead if they work hard.
5. Singapore is an open society where all individuals do achieve higher status through hard work.
6. Advancement in Singaporean society is equally possible for all individuals.

Prescriptive Meritocracy Scale

1. People who work hard should achieve success.
2. If people work hard they should get what they want.
3. With hard work, ethnic minorities should be able to climb the ladder of success just as much as Chinese.
4. Discrimination should not prevent minority groups from getting ahead if they work hard.
5. Singapore should be an open society where all individuals can achieve higher status through hard work.
6. Advancement in Singaporean society should be equally possible for all individuals.

Scale: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Neither agree nor disagree, (5) Somewhat agree, (6) Agree, (7) Strongly agree

Appendix C

Optimism scale from Life Orientation Test – Revised (Scheier et al., 1994)

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax. (Filler item)
3. If something can go wrong for me, it will. (R)
4. I'm always optimistic about my future.
5. I enjoy my friends a lot. (Filler item)
6. It's important for me to keep busy. (Filler item)
7. I hardly ever expect things to go my way. (R)
8. I don't get upset too easily. (Filler item)
9. I rarely count on good things happening to me. (R)
10. Overall, I expect more good things to happen to me than bad.

Scale: (1) I disagree a lot, (2) I disagree a little (3) I neither agree or disagree, (4) I agree a little, (5) I agree a lot

R = reverse-scored item

Appendix D

Analysis-Holism Scale (Choi et al., 2007)

Causality

1. Everything in the universe is somehow related to each other.
2. Nothing is unrelated.
3. Everything in the world is intertwined in a causal relationship.
4. Even a small change in any element of the universe can lead to significant alterations in other elements.
5. Any phenomenon has numerous numbers of causes, although some of the causes are not known.
6. Any phenomenon entails a numerous number of consequences, although some of them may not be known.

Attitude Toward Contradictions

7. It is more desirable to take the middle ground than go to extremes.
8. When disagreement exists among people, they should search for ways to compromise and embrace everyone's opinions.
9. It is more important to find a point of compromise than to debate who is right/wrong, when one's opinions conflict with other's opinions.
10. It is desirable to be in harmony, rather than in discord, with others of different opinions than one's own.
11. Choosing a middle ground in an argument should be avoided. (R)
12. We should avoid going to extremes.

Perception of Change

13. Every phenomenon in the world moves in predictable directions. (R)

14. A person who is currently living a successful life will continue to stay successful. (R)
15. 15. An individual who is currently honest will stay honest in the future. (R)
16. If an event is moving toward a certain direction, it will continue to move toward that direction. (R)
17. Current situations can change at any time.
18. Future events are predictable based on present situations. (R)

Locus of Attention

19. The whole, rather than its parts, should be considered in order to understand a phenomenon.
20. It is more important to pay attention to the whole than its parts.
21. The whole is greater than the sum of its parts.
22. It is more important to pay attention to the whole context rather than the details.
23. It is not possible to understand the parts without considering the whole picture.
24. We should consider the situation a person is faced with, as well as his/her personality, in order to understand one's behavior.

Scale: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Neither agree nor disagree, (5) Somewhat agree, (6) Agree, (7) Strongly agree

R = reverse-scored item

Appendix E

General National Pride (adapted from Smith & Kim, 2006)

1. I would rather be a citizen of Singapore than of any other country in the world.
2. There are some things about Singapore today that makes me ashamed of Singapore.
3. The world would be a better place if people from other countries were more like Singaporeans.
4. Generally, speaking Singapore is a better country than most other countries.
5. People should support their country even if the country is in the wrong.

Scale: (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, (5) Strongly agree.

Appendix F

Supplementary Analyses for Estimates of Intragenerational Social Mobility

RQ2: What are the psychological factors that would influence estimations of intergenerational social mobility?

Self-enhancement bias. When estimations of intragenerational social mobility was regressed on BAE, β = 0.15, *SE* = 0.07, *p* = .03, 95% CI [0.02, 0.29], and GNP, β = 0.06, *SE* = 0.07, *p* = .37, 95% CI [-0.07, 0.20], only BAE was a significant predictor[5]. Higher BAE was predictive of higher intergenerational social mobility estimates. This finding was different for that of intergenerational mobility estimates, where both GNP and BAE were significant predictors.

Holistic thinking style. The total AHS score did not predict intragenerational social mobility estimates, β = 0.04, *SE* = 0.07, *p* = .54, 95% CI [-0.10, 0.18]. Similar to the findings for intergenerational social mobility estimates, none of the AHS subscales predicted intragenerational social mobility estimates: causality subscale (β = 0.13, *SE* = 0.07, *p* = .054, 95% CI = -0.001, 0.27), attitude towards contradiction (β = 0.05, *SE* = 0.07, *p* = .52, 95% CI = -0.09, 0.18), attitude towards change (β = -0.04, *SE* = 0.07, *p* = .56, 95% CI = -0.18, 0.10) and locus of attention (β = -0.04, *SE* = 0.07, *p* = .57, 95% CI = -0.18, 0.10) did not significantly predict mobility estimates[6].

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[5] When estimations of intragenerational social mobility was regressed on trait optimism, BAE (β = 0.13, *SE* = 0.08, *p* = .08, 95% CI = -0.02, 0.28) and GNP (β = -0.06, *SE* = 0.07, *p* = .42, 95% CI = -0.08, 0.20) both predictors were non-significant.

[6] Similar observations were made for intragenerational social mobility estimates when trait optimism was controlled for: AHS total score (β = 0.04, *SE* = 0.07, *p* = .58, 95% CI = -0.10, 0.18), causality (β = 0.13, *SE* = 0.07, *p* = .06, 95% CI = -0.01, 0.27), attitude towards contradiction (β = 0.04, *SE* = 0.07, *p* = .57, 95% CI = -0.10, 0.18), attitude towards change (β

Belief congruence. According to RSA, there was no significant congruence effect for the prediction of intragenerational social mobility estimates. This finding was similar to that for intergenerational social mobility estimates. The values for p_{10}, p_{11} and a_3 met the criteria for congruence effects. $p_{10}$was not significantly different from 0, p_{10} = -8.19, p =.48, 95% CI [-30.78, 14.41], and p_{11} was close to 1, p_{11} = 5.28, 95% CI [-9.07, 19.62], suggesting that the ridge of surface was at LOC. Also, $a_3$was not significant, a_3 = 7.68, p = .50, 95% CI [-14.85, 30.22], indicating that the maximum point of the surface was at (0, 0). However, the confidence intervals for all three parameters were too wide to be conclusive. In addition, a_4 was non-significant, a_4 = -3.92, p = .30, 95% CI [-11.27, 3.44]. This indicated that the response surface plane was not a parabola. The coefficients for the polynomial regression model predicting estimations of intragenerational social mobility and the corresponding RSA were presented in Table 5 and 6 respectively. The model accounted for 7.4% of the variance in intragenerational social mobility estimates. The response surface model for estimation of intragenerational social mobility can be found in Figure 3.

Social class. For estimations of intragenerational social mobility, the pattern of findings was the same as that for intergenerational social mobility: lower parents' education also predicted higher intergenerational mobility, β = -0.25, *SE* = 0.06, p < .001, 95% CI [-0.37, -0.13], whereas household income, β = -0.11, *SE* = 0.07, p = .11, 95% CI [-0.25, 0.03], subjective social class ranking in the university, β = -0.07, *SE* = 0.06, p = .30, 95% CI [-0.19, 0.06],

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= -0.04*,* *SE* = 0.07*,* p = .61, 95% CI = -0.17, 0.10) and locus of attention (β = -0.04*,* *SE* = 0.07*,* p = .54, 95% CI = -0.18, 0.10) were all found to be non-significant.

and subjective social class ranking in Singapore, β = -0.08, *SE* = 0.06, *p* = .22, 95% CI [-0.20, 0.05], were not associated with perceptions of intragenerational social mobility[7].

RQ3: Does congruence in beliefs about meritocracy mediate the effect of social class on perceptions of social mobility?

For the mediation analyses, belief congruence was operationalized as the absolute difference between prescriptive and descriptive meritocratic beliefs. Higher scores for belief congruence reflected a larger incongruence between the two types of beliefs, regardless of the direction of incongruence.

Parents' level of education as predictor. The direct effect of parents' level education on intragenerational mobility estimates was significant, β = -0.22, *t*(248)= -3.69, *p* < .001, 95% CI [-0.34, -0.10], revealing that individuals with poorer educated parents also estimated intragenerational social mobility to be higher, after controlling for belief congruence. Lower parents' level of education also predicted higher belief congruence, β = 0.13, *t*(249)= 2.10, *p* = .04, 95% CI [0.01, 0.26]. Belief congruence was also a significant predictor of intragenerational mobility estimates, β = -0.21, *t*(248)= -3.49, *p* < .001, 95% CI [-0.33, -0.09]; higher belief congruence was associated with higher intragenerational social mobility estimates. The indirect effect of parents' education on intragenerational social mobility estimates through belief congruence was significant, β = -0.03, *SE* = .02, 95% CI [-0.06, -0.001].

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[7] The findings remained the same after controlling for trait optimism. Higher parents' education predicted lower perceptions of intragenerational mobility, β = -0.25, *SE* = 0.06, *p* < .001, 95% CI [-0.37, -0.13]. In contrast, household income, β = -0.09, *SE* = 0.07, *p* = .20, 95% CI [-0.23, 0.05], subjective social class ranking in the university, β = -0.11, *SE* = 0.07, *p* = .10, 95% CI [-0.24, 0.02], and subjective social class ranking in Singapore, β = -0.11, *SE* = 0.06, *p* = .10, 95% CI [-0.23, 0.02], were non-significant predictors.

Similar to the analysis for intergenerational social mobility, belief congruence partially mediated the relationship between parents' level of education and intragenerational social mobility estimates.

Household income as predictor. The direct effect of household income on intragenerational mobility estimates was non-significant, β = -0.08, $t(203) = -1.17$, $p = .24$, 95% CI [-0.22, 0.05]. Household income also did not predict belief congruence, β = 0.02, $t(204) = 0.25$, $p = .80$, 95% CI [-0.12, 0.16]. On the other hand, belief congruence remained predictive of intragenerational social mobility estimates in this model after controlling for household income, β = -0.20, $t(203) = -2.88$, $p = .004$, 95% CI [-0.33, -0.06]. Higher belief congruence predicted higher intragenerational social mobility estimates, ignoring the effect of household income. However, as household income was not associated with belief congruence, the mediation pathway was non-significant, β = -0.004, $SE = 0.01$, 95% CI [-0.03, 0.03]. Belief congruence did not mediate the relationship between household income and intragenerational social mobility estimates.

Subjective social class (university) as predictor. The direct effect of subjective social class (university) on intragenerational mobility estimates was non-significant, β = -0.08, $t(248) = -1.28$, $p = .20$, 95% CI [-0.20, 0.04]. There was no statistically significant association between subjective social class (university) and intragenerational social mobility estimates, controlling for belief congruence. Subjective social class (university) also did not predict belief congruence, β = -0.05, $t(249) = -0.82$, $p = .41$, 95% CI [-0.18, 0.07]. While higher belief congruence predicted higher intragenerational social mobility estimates after controlling for subjective social class (university), β = -0.24,

$t(248) = -3.98$, $p < .001$, 95% CI [-0.37, -0.12], the indirect effect of subjective social class (university) on intragenerational social mobility estimates was non-significant, β = 0.01, *SE* = 0.02, 95% CI [-0.02, 0.05]. Hence, contrary to hypothesis, the association between subjective social class (university) and intragenerational social mobility estimates was not mediated by belief congruence.

Subjective social class (country) as predictor. The direct effect of subjective social class (country) on intragenerational mobility estimates was non-significant, β = -0.08, $t(248) = -1.29$, $p = .20$, 95% CI [-0.20, 0.04]. Subjective social class (country) also did not predict belief congruence, β = -0.004, $t(249) = -0.06$, $p = .95$, 95% CI [-0.13, .12]. In contrast, belief congruence predicted intragenerational social mobility estimates after controlling for subjective social class (country), β = -0.24, $t(248) = -3.92$, $p < .001$, 95% CI [-0.36, -0.12]. Ignoring the effect of subjective social class (country), higher belief congruence was associated with higher intragenerational social mobility estimates. However, as subjective social class (country) was not associated with belief congruence, the mediation pathway was not supported, β = 0.009, *SE* = 0.02, 95% CI [-0.03, 0.03][8]. Hence, the association between subjective social class (country) and intragenerational social mobility estimates was not mediated by belief congruence.

[8] Due to the same error as the mediation analysis for estimates of intergenerational social mobility, the estimates for the indirect pathway were derived from a separate analysis using unstandardized variables in Process.

Appendix G

Satisfaction with Society Scale (adapted from Zimmerman & Reyna, 2013)

1. I am satisfied with how Singapore operates today
2. I trust the government.

Scale: (1) Strongly disagree, (2) Disagree, (3) Slightly disagree, (4) Neither agree nor disagree, (5) Slight agree, (6) Agree, (7) Strongly agree.

The responses for the two items were averaged for each participant and higher scores reflected higher satisfaction with society ($M = 3.32$, $SD = 0.79$, $\alpha = .66$).

Table 1

Descriptive Statistics of Key Variables

Variable	*N*	*M*	*SD*	α
Estimation of Intergenerational Social Mobility	251	45.02	19.19	-
Estimation of Intragenerational Social Mobility	251	38.72	18.68	-
Descriptive Meritocratic Beliefs	251	4.26	1.05	.81
Prescriptive Meritocratic Beliefs	251	6.22	0.67	.79
Trait Optimism	251	3.14	0.82	.81
Better-than-Average Effect (BAE)	206	6.30	0.92	.66
Analysis-Holism Scale (AHS)	206	4.97	0.47	.72
AHS – Causality Subscale	206	5.24	0.77	.75
AHS – Attitude towards Contradiction Subscale	206	4.93	0.89	.71
AHS – Perception of Change Subscale	206	4.69	0.84	.70
AHS – Locus of Attention Subscale	206	5.02	0.77	.69
General National Pride (GNP)	206	2.95	0.51	.44
Parents' Average Level of Education	251	5.16	1.94	-
Monthly Household Income	206	6.80	3.05	-
Subjective Social Class (University)	251	5.16	1.92	-
Subjective Social Class (Country)	251	6.18	1.46	-
Knowledge on Social Class Issues	251	2.80	0.69	-

Note. The sample size for BAE, AHS, satisfaction with society and GNP were lower as these measures were not included in the pilot study.

Table 2

Correlation between Key Variables

	N	1	2	3	4	5	6
1. Intergenerational social mobility estimates	251	1.00					
2. Intragenerational social mobility estimates	251	0.54**	1.00				
3. BAE	206	0.21**	0.16*	1.00			
4. GNP	206	0.17*	0.07	0.07	1.00		
5. AHS Mean	206	0.01	0.04	0.15*	-0.14*	1.00	
6. AHS Causality	206	0.03	0.13	0.14*	-0.06	0.63**	1.00
7. AHS Contradiction	206	0.06	0.05	0.16*	0.00	0.67**	0.2**
8. AHS Change	206	-0.06	-0.04	-0.11	-0.23**	0.33**	-0.05
9. AHS Attention	206	0.00	-0.04	0.16*	-0.04	0.67**	0.35**
10. Descriptive Meritocracy	251	0.32**	0.25**	0.17*	0.25**	-0.06	-0.11
11. Prescriptive Meritocracy	251	-0.04	-0.01	0.13	-0.11	0.11	0.02
12. Belief Congruence (Absolute)	251	-0.31**	-0.24**	-0.06	-0.29**	0.12	0.10
13. Parents' Education	251	-0.21**	-0.25**	0.00	-0.12	0.00	-0.10
14. Household income	206	-0.11	-0.08	0.10	0.02	-0.05	0.02
15. SES (SG)	251	-0.05	-0.08	0.26**	0.06	-0.02	0.00
16. SES (Uni)	251	-0.02	-0.07	0.29**	0.05	-0.02	-0.05
17. Knowledge	251	0.11	0.12	0.16*	0.05	0.02	0.12

Table 2 (Continued)

	7	8	9	10	11	12
1. Intergenerational social mobility estimates						
2. Intragenerational social mobility estimates						
3. BAE						
4. GNP						
5. AHS Mean						
6. AHS Causality						
7. AHS Contradiction	1.00					
8. AHS Change	-0.09	1.00				
9. AHS Attention	0.37**	-0.13	1.00			
10. Descriptive Meritocracy	0.02	-0.18**	0.13	1.00		
11. Prescriptive Meritocracy	0.12	-0.01	0.12	0.11	1.00	
12. Belief Congruence (Actual)	0.05	0.15*	-0.04	-0.83**	0.47**	1.00
13. Parents' Education	-0.05	0.14*	0.01	-0.06	0.11	0.12
14. Household income	-0.09	-0.03	-0.01	0.05	0.07	0.00
15. SES (SG)	0.00	0.03	-0.08	0.06	0.11	0.00
16. SES (Uni)	0.05	-0.08	0.03	0.12	0.09	-0.06
17. Knowledge	0.09	-0.17*	0.01	-0.02	-0.05	-0.01

Table 2 (Continued)

	13	14	15	16
1. Intergenerational social mobility estimates				
2. Intragenerational social mobility estimates				
3. BAE				
4. GNP				
5. AHS Mean				
6. AHS Causality				
7. AHS Contradiction				
8. AHS Change				
9. AHS Attention				
10. Descriptive Meritocracy				
11. Prescriptive Meritocracy				
12. Belief Congruence (Actual)				
13. Parents' Education	1.00			
14. Household income	0.43**	1.00		
15. SES (SG)	0.37**	0.51**	1.00	
16. SES (Uni)	0.34**	0.49**	0.72**	1.00
17. Knowledge	0.06	0.01	0.05	0.06

Table 3

Polynomial Regression Model for Response Surface Analysis (RSA)

	Coefficient labels	Coefficient	SE	LLCI	ULCI	β	p
Intercept	b_0	42.87	6.47	30.18	55.56	2.24	<.001
Prescriptive Meritocracy (X)	b_1	3.84	7.07	-10.01	17.69	0.13	0.59
Descriptive Meritocracy (Y)	b_2	6.85	5.11	-3.16	16.85	0.37	0.18
X^2	b_3	-1.67	1.88	-5.35	2.02	-0.23	0.38
$X \times Y$	b_4	-0.37	2.05	-4.40	3.66	-0.05	0.86
Y^2	b_5	0.91	0.93	-0.91	2.73	0.06	0.33

Note. The regression model predicts the congruence effect of prescriptive and descriptive meritocracy beliefs on estimation of intergenerational social mobility.

Table 4

RSA Indicators for Determination of Congruence Effect on Intergenerational Social Mobility estimates and Main Effect of Predictors (Descriptive and Prescriptive Meritocracy)

Label	Criteria for Congruence	Obtained Coefficient	*SE*	*LLCI*	*ULCI*	*p*
a_1		10.68	5.98	-1.04	22.41	0.07
a_2		-1.13	2.04	-5.12	2.87	0.58
a_3	$p > .05$	-3.01	10.78	-24.14	18.12	0.78
a_4	$p < .05$	-0.39	3.52	-7.29	6.52	0.91
a_5		-2.58	2.17	-6.83	1.68	0.24
p_{10}	$p_{10} \approx 0$	18.04	101.80	-181.48	217.57	0.86
p_{11}	$p_{11} \approx 1$	-14.00	84.07	-178.76	150.77	0.87

Note. For congruence effect to be significant, we expect $p_{10} \approx 0$, $p_{11} \approx 1$, a non-significant a_3 and a significant a_4. When $p_{10} \approx 0$, $p_{11} \approx 1$, this indicates that the ridge of the surface sits on the line of congruence. A non-significant a_3 suggests that the maximum or minimum point of the surface is at (0, 0). In addition, when a_4 is significantly negative, the surface in the graph will be concave, while a significantly positive a_4 would show a convex surface. If the congruence effect is supported by RSA, the main effect of the predictors can be determined by a_1. A significant positive a_1 would indicate a positive main effect of the predictors where higher congruent values of both predictors would predict higher outcomes.

Table 5

Polynomial Regression Model for Response Surface Analysis (RSA)

	Coefficient labels	Coefficient	SE	LLCI	ULCI	β	p
Intercept	b_0	31.49	8.04	15.74	47.25	1.69	< .001
Prescriptive Meritocracy (X)	b_1	9.56	8.09	-6.31	25.42	0.34	0.24
Descriptive Meritocracy (Y)	b_2	1.87	4.39	-6.73	10.47	0.11	0.67
X^2	b_3	-2.86	1.98	-6.74	1.03	-0.40	0.15
X × Y	b_4	1.16	1.89	-2.53	4.86	0.16	0.54
Y^2	b_5	0.10	0.95	-1.75	1.96	0.01	0.91

Note. The regression model predicts the congruence effect of prescriptive and descriptive meritocracy beliefs on estimation of intragenerational social mobility.

Table 6

RSA Indicators for Determination of Congruence Effect on Intragenerational Social Mobility estimates and Main Effect of Predictors (Descriptive and Prescriptive Meritocracy)

Label	Criteria for Congruence	Obtained Coefficient	*SE*	*LLCI*	*ULCI*	*p*
a_1		11.43	6.11	-0.55	23.40	0.06
a_2		-1.59	1.77	-5.06	1.88	0.37
a_3	$p > .05$	7.68	11.50	-14.85	30.22	0.50
a_4	$p < .05$	-3.92	3.75	-11.27	3.44	0.30
a_5		-2.96	2.15	-7.17	1.25	0.17
p_{10}	$p_{10} \approx 0$	-8.19	11.53	-30.78	14.41	0.48
p_{11}	$p_{11} \approx 1$	5.28	7.32	-9.07	19.62	0.47

Note. For congruence effect to be significant, we expect $p_{10} \approx 0$, $p_{11} \approx 1$, a non-significant a_3 and a significant a_4. When $p_{10} \approx 0$, $p_{11} \approx 1$, this indicates that the ridge of the surface sits on the line of congruence. A non-significant a_3 suggests that the maximum or minimum point of the surface is at (0, 0). In addition, when a_4 is significantly negative, the surface in the graph will be concave, while a significantly positive a_4 would show a convex surface. If the congruence effect is supported by RSA, the main effect of the predictors can be determined by a_1. A significant positive a_1 would indicate a positive main effect of the predictors where higher congruent values of both predictors would predict higher outcomes.

Figure 1a

Example of RSA graph for a significant congruence effect for H2c with no main effect of predictors

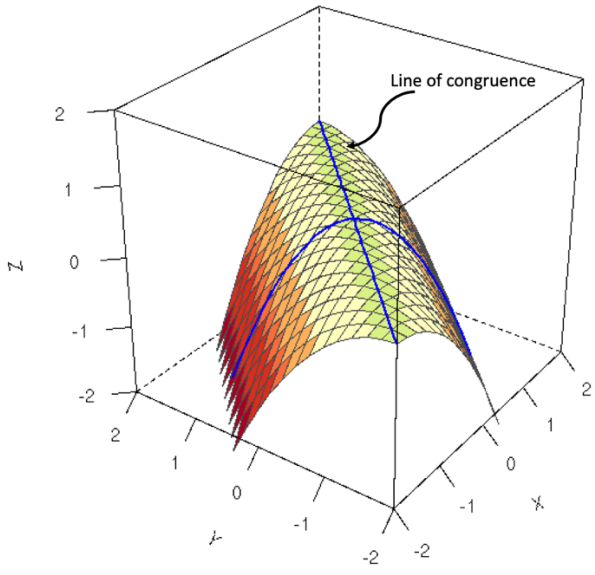

Figure 1b

Example of RSA graph for a significant congruence effect for H2c with significant main effect of predictors

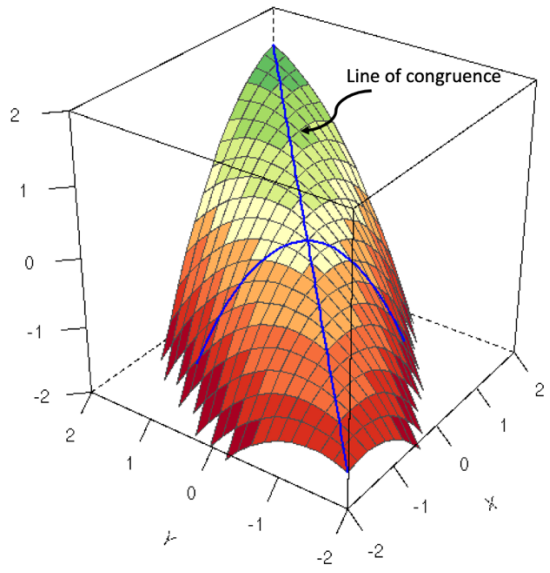

Figure 2

Effect of Belief Congruence on Intergenerational Social Mobility Estimates

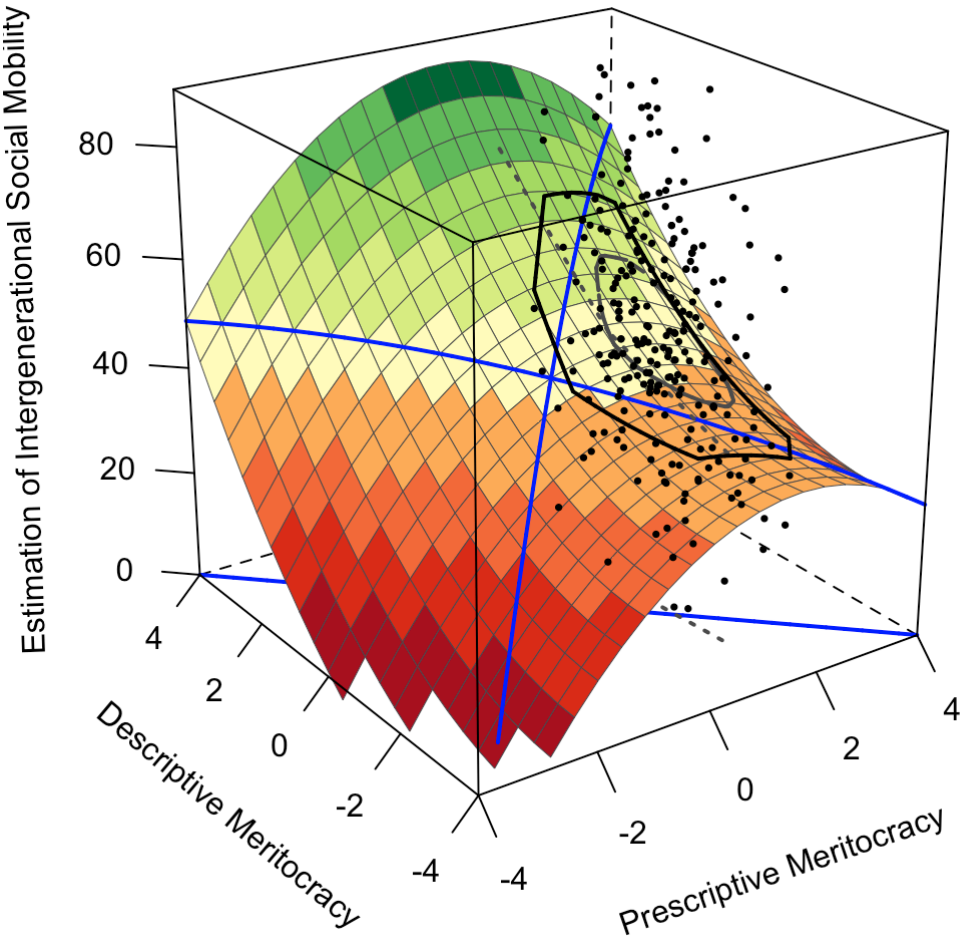

Figure 3

Effect of Belief Congruence on Intragenerational Social Mobility Estimates