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Societal-level utility value strengthens the relationship between student-level utility value and achievement: A person-culture fit perspective

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Background. Expectancy–value theory posits that higher levels of utility-value yield better achievement outcomes. Much of the existing research on utility value has focused on the individual as the unit of analysis. Person–culture fit theory, however, suggests that it is also important to consider the fit between the person and the broader society one is embedded in. The greater the fit, the more optimal outcomes ensue. However, to our knowledge past studies have not examined utility value from a person–culture fit perspective.

Aims. This study aimed to examine whether person–culture fit in utility value, defined as the match between the student's and the society's utility value perceptions, is associated with more optimal outcomes. More specifically, we examined (1) how utility value predicted achievement and (2) whether societal-level utility value changed the magnitude of the relationship between student-level utility value and achievement.

Sample. We used the Programme for International Student Assessment (PISA) 2009 data provided by 502,261 15-year-old students from 73 countries/societies.

Methods. Multilevel random-slopes structural equation modelling was used.

Results. Across all societies, students with higher utility value had better achievement. Moreover, in societies where schooling is highly valued, students' utility value was a stronger predictor of achievement in reading, math, and science confirming our person–culture fit hypothesis.

Conclusion. These findings signify the importance of person–culture fit in utility value. It also has important implications for motivation research by demonstrating the need to take the broader societal context into account and moving beyond an exclusive focus on the individual student as the unit of analysis.

Expectancy–value theory highlights the importance of utility value for learning and achievement (Eccles *et al.*, 1983; Eccles & Wigfield, 2002; Wigfield, 1994). When students perceive schooling as useful for accomplishing their life goals (*utility value*), they work harder and get better grades (Hulleman, Godes, Hendricks, & Harackiewicz, 2010). Much of the existing research on utility value has focused on an individual-differences approach,

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examining how different levels of utility value are associated with educational outcomes (Wang & Degol, 2013). However, an individual-differences approach neglects the importance of the interaction between the person and the broader environmental context one is embedded in, and more importantly, what implications this interaction might have for student learning and achievement.

Emerging research on person–culture fit (also called person–environment fit) has highlighted the importance of fit, defined as a match between the individual and the broader societal context, in optimizing outcomes (Fulmer *et al.*, 2010; van Vianen, 2018). Although person–culture fit research has not been applied to the domain of utility value, there are strong theoretical reasons to suggest that students will experience better achievement outcomes when there is a fit between one's utility-value perceptions and the utility-value perceptions of others in the broader society one is in.

To address this gap, this study aimed to explore whether the fit between one's utility-value perceptions and the utility-value perceptions of the broader society would be associated with learning and achievement. We hypothesized that in societies that have high utility value, the relationship between individual utility value and achievement will be stronger. We analysed secondary data from the Programme for International Student Assessment (PISA) 2009 data provided by 502,261 15-year-old students from 73 societies to test our person–culture fit hypothesis.

Expectancy–value theory

A core tenet of expectancy–value theory is that expectancies for success and subjective task value influence achievement-related behaviours (Eccles & Wigfield, 2002). Expectancies for success pertain to students' beliefs about how well they will do in upcoming tasks. Task value, on the other hand, pertains to the perceived importance of the task. There are different types of task value including utility value (it is useful or relevant for other tasks or aspects of an individual's life); intrinsic value (it is enjoyable and fun to engage with); attainment value (doing well on the tasks influences the students' self-worth and identity); and cost value (negative aspects of engaging in the activity; Eccles & Wigfield, 2002). We focus particularly on utility value because it is one of the most well-researched constructs among the four value domains in expectancy–value theory, and there is a huge body of research showing that higher utility-value predicts better learning, more effort, and greater interest in the relevant domain (Chouinard, Karsenti, & Roy, 2007; Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2016; Harackiewicz, Rozek, Hulleman, & Hyde, 2012; Lauermann, Tsai, & Eccles, 2017).

Past studies on utility value have provided solid evidence that utility value is associated with greater learning gains (Durik, Vida, & Eccles, 2006; Harackiewicz, Barron, Tauer, & Elliot, 2002; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Hulleman, Durik, Schweigert, & Harackiewicz, 2008; Nagy, Trautwein, Baumert, Koller, & Garrett, 2006). More recent studies have focused on interventions that enhance utility-value perceptions. Increasing utility value has been found to make students more interested in the task and lead to enhanced performance (Canning, Harackiewicz, Priniski, Hecht, Tibbetts, & Hyde, 2018; Hulleman, Godes, Hendricks, & Harackiewicz, 2010).

Studies on utility value have mostly focused on the individual level, exploring how varying levels of utility-value predict learning-related outcomes (Hecht *et al.*, 2019; Lauermann, Tsai, & Eccles, 2017; Trautwein *et al.*, 2012). Researchers have also examined social factors such as how parents and teachers influence utility-value perceptions (Chouinard *et al.*, 2007; Harackiewicz *et al.*, 2012; Rozek, Svoboda, Harackiewicz,

Hulleman, & Hyde, 2017). However, researchers have seldom examined how one's utility value perceptions match the utility-value perceptions of the broader society one is embedded in, and what implications this fit may have for achievement.

Person–culture fit theory

Person–culture fit theory posits that the more the characteristics of the individual match those of the broader environment one is embedded in, the more optimal outcomes ensue (Fulmer *et al.*, 2010). Studies have focused on fit in different psychological constructs such as political beliefs (the fit between one's political orientations and the political orientations of the broader environment; Chopik & Motyl, 2016), values (fit between one's social values and the dominant social values in the society (Du, Chen, Chi, & King, 2019), personality (fit between one's personality traits and the dominant personality traits in one's place of residence; Bleidorn *et al.*, 2016); emotions (fit between one's emotional profile and the dominant emotions experienced by others in the society; De Leersnyder, Kim, & Mesquita, 2015; De Leersnyder, Mesquita, Kim, Eom, & Choi, 2014); and demographics (fit in demographic characteristics; Chatman & Flynn, 2001). Though different forms of fit have been examined, the core tenet remains the same: better fit results in better outcomes including psychological well-being, sense of belonging, adjustment, and self-esteem among others (Bleidorn *et al.*, 2016; Fulmer *et al.*, 2010).

Person–culture fit has also been explored in relation to different contexts. Past studies have focused on cities, regions within a country, and nations as the unit of analysis. For example, Bleidorn *et al.* (2016) examined how the fit between individual personality and the city's personality, which was defined as the prevalent personality of the residents of a city, predicted well-being. They found that individuals living in cities that share the same personality traits as they do, especially in terms of openness, agreeableness, and conscientiousness, have better self-esteem.

Moving up the geographical scale, Chopik and Motyl (2016) focused on regions within a country. They found that residents whose political beliefs matched the prevailing political beliefs of their place of residence have better social outcomes (e.g., easier to form relationships, better perspective-taking). Fulmer *et al.* (2010) focused on country as the level of analysis and found that the relationship between a certain personality trait and well-being was amplified in societies characterized by higher levels of that trait. For example, individuals who scored high in extraversion, promotion-focus, and locomotive regulatory style experienced higher self-esteem when the nations they live in also shared these characteristics. In this study, we use a similar approach and aggregate responses within a country to operationalize culture-level utility value.

Using country/nation as a proxy for culture is a commonly used approach in cross-cultural research (Hofstede, 1980; Oyserman, 2017; Oyserman, Coon, & Kemmelmeier, 2002; Schwartz, 1997). However, two caveats need to be borne in mind when using this approach. First, there are huge differences among individuals within a country. Cross-cultural researchers acknowledge that there is greater heterogeneity within than between countries (Leung & Cohen, 2011). Individuals within the same country display a certain psychological attribute (i.e., utility value) to different degrees (see also Matsumoto, Grissom, & Dinnel, 2001; Oyserman, 2017). Second, though we use country as the unit of analysis, culture can also be operationalized in different ways. Researchers have argued that social class, religion, and region within a country are different forms of culture (Cohen, 2009; Kraus, Piff, & Keltner, 2011). However, in this study, we operationalize

culture in terms of country because of past precedent and given that this approach is the most closely aligned with the person–culture fit perspective.

Person–culture fit in utility value

The importance of person–culture fit has been documented across various psychological domains and at different geographical scales (Bleidorn *et al.*, 2016; Fulmer *et al.*, 2010). We extend the existing literature on person–culture fit to the domain of utility value. We define person–culture fit in utility value as the match between an individual's utility-value perceptions and the utility-value perceptions of the broader society one is in.

Although utility-value fit has not been explored in past studies, existing research on person–culture fit suggests that utility-value fit would lead to better motivational payoffs. Hypothetically, one can imagine Student A with high utility-value residing in a society where everyone values schooling as well (high person–culture fit). In such a society, she is more likely to achieve more. Contrast this with Student B whose utility-value level is as high as Student A but who is residing in a society where schooling is not that valued (low person–culture fit). Despite being equally motivated, she might not achieve as much as her counterpart Student A. What might account for the positive impact of experiencing value fit? We put forth several possibilities in line with the existing literature.

Environmental affordances

First, when individuals' values match the values of those around them, then the environment provides affordances that make it easier for individuals to reach their goals (Gibson, 1977). For example, if students who value schooling are in an environment that values it as well, institutional norms or structures in the environment will afford the attainment of schooling-related goals. Because everyone's values are more aligned, this facilitates higher levels of achievement.

Sense of belonging

Students who value school and reside in countries that also value schooling might experience a greater sense of belonging. On the other hand, students who endorse values that their society does not value will likely have negative experiences as a social misfit and thereby reduce belonging.

Social validation

If students are in an environment where the values of their peers match their own, they should experience less uncertainty about themselves and a greater validation of 'the way they are' (Hardin & Higgins, 1996). Students whose values match the values of their society exist in a shared reality that helps validate their experiences which in turn can boost feelings of competence.

A student who highly values schooling but resides in a society where most other students do not value school will likely experience more hindrances to achieving academic-related goals. Moreover, there is also the danger that this student is cast as an outsider because her values differ so much from those of others around her leading to lower belonging.

On the other hand, when a student who has high utility value for schooling resides in a society where schooling is highly valued, she is more likely to experience the environment as facilitative of her school-related goals. She is also more likely to feel a sense of belonging and be socially validated given her motivation matches those of her peers.

The present study

Our study is informed by two key theoretical perspectives. The first is expectancy–value theory which posits the importance of utility value for optimizing learning and achievement (Eccles & Wigfield, 2002). The second is person–culture fit theory which assumes that optimal outcomes ensue when there is a fit between oneself and the broader environment (Fulmer *et al.*, 2010). These two theoretical perspectives lead us to posit the following hypothesis:

Hypothesis 1. At the individual level, students who have higher utility value will have better achievement.

Hypothesis 2. In societies where utility value is high, students who endorse high utility value will experience greater achievement (person–culture fit hypothesis).

See Figure 1 for a representation of our conceptual framework.

To examine this hypothesis, we used the OECD data on the Programme for International Student Assessment (PISA) 2009. PISA conceptualizes achievement as different types of literacy, namely, reading literacy, mathematics literacy, and science literacy. In particular, reading literacy is defined as 'students' ability to understand, use, and reflect on written text to achieve their purposes'; mathematical literacy as 'the ability of students to analyse, reason, and communicate ideas effectively as they pose, formulate, solve, and interpret solutions to mathematical problems in a variety of situations'(Schleicher, Zimmer, Evans, & Clements, 2009, p. 14); and scientific literacy is referred to as 'the ability to use scientific knowledge and processes not only to understand the natural world but to participate in decisions that affect it' (p. 15). PISA scores have been widely used as an indicator of academic achievement across numerous studies (Chiu & Chow, 2015).

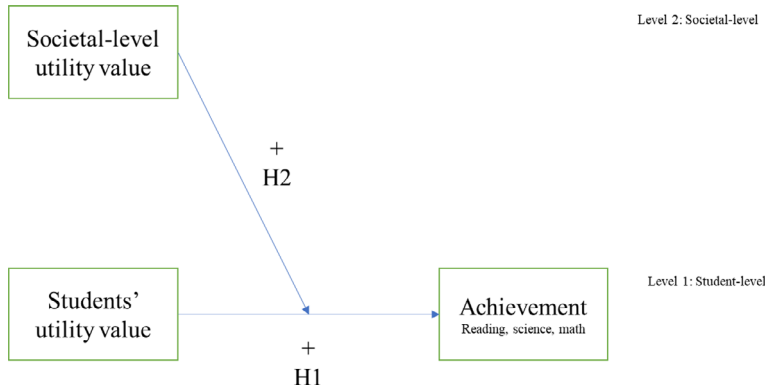

Figure 1. Conceptual framework for the current study.

We controlled for the effects of individual-level factors such as gender and socio-economic status and the effects of societal-level socio-economic development on the three achievement outcomes. All these factors have been identified as important predictors of achievement in previous research (Sirin, 2005), and we added them to avoid potential third variable confounds.

Method

Data and measures

The data used for our study included a total of 502,261 adolescents (Mean age = 15.78, *SD* = 0.29) from 73 societies, each society occupying 0.1% to 7.5% of the total sample. The gender ratio was: 51% girls and 49% boys.

Utility value

Utility value was operationalized in terms of utility value for schooling (how useful schooling is) using a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Four items (α = .65) were used: 'School has done little to prepare me for adult life when I leave school' (*M* = 3.33, *SD* = 0.75); 'School has been a waste of time' (*M* = 3.43, *SD* = 0.70); 'School has helped give me confidence to make decisions' (*M* = 2.99, *SD* = 0.77); and 'School has taught me things which could be useful in a job' (*M* = 3.33, *SD* = 0.75). The first two items were reverse-scored such that a higher score reflected greater levels of utility value. These four items have been used by previous researchers to operationalize utility value (e.g., Chiu, Pong, Mori, & Chow, 2012; Godor & Szymanski, 2017; Lee & Stankov, 2013).

Achievement

Achievement scores in PISA pertain to three domains: math, reading, and science. The means of achievement scores were 463.98 (*SD* = 104.37) for math, 463.38 (*SD* = 102.51) for reading, and 468.82 (*SD* = 103.55) for science.

Societal-level utility value

Drawing on students' responses to the four utility-value items, we computed the societal-level aggregate of utility value. The resulting values ranged from 2.82 (Korea) to 3.4 (Albania) with a mean of 3.18 (*SD* = 0.14). Aggregating individual-level responses to operationalize the societal-level construct is common practice in person–culture fit research (Bleidorn *et al.*, 2016; Fulmer *et al.*, 2010) as well as cross-cultural psychology more broadly (Chen, Mathieu, & Bliese, 2004).

Covariates

At the societal level, the Human Development Index (HDI) of the 73 societies was used as a predictor: *M* = 3.49, *SD* = 0.68. HDI was developed by the United Nations (UNDP, 2009) as a measure of development across countries and combined three key dimensions: health and longevity, knowledge and education, and standard of living. HDI is used as a global measure of socio-economic development of countries worldwide.

Girls were coded as 0 and boys coded as 1. SES (socio-economic status) was represented using the ESCS indicator (economic and social culture status) in the PISA 2009 data set. The ESCS is a standardized score containing information regarding students' family background (e.g., parents' education and occupation, and number of books at home; OECD, 2016). The mean of SES for our data was $M = -0.30$, $SD = 1.14$.

Data analysis

The proportion of missing data for the four utility-value items was small, ranging from 0.5% to 0.8%. Following Enders (2010), we used the state-of-the-art practice of multiple imputations and computed the missing values at the individual level using IBM SPSS Version 20.0 (IBM Corporation, 2011).

To examine person–culture fit in terms of utility value, we used multilevel structural equation modelling (ML-SEM) with random slopes (Muthén, 1994). ML-SEM allows us to test cross-level interactions. This technique has two essential assumptions: An outcome variable (i.e., achievement) is explained by predictors at two levels (i.e., individual-level utility value and societal-level utility value), and the effect of individual-level utility value on achievement varies depending on societal-level utility value (Finch & Bolin, 2017).

We first examined the variation in the outcome variables between societal-level units, a concept known as intra-class correlation (ICC; Barcikowski, 1981). According to Barcikowski (1981), even small ICCs (e.g., significantly larger than zero) can impact tests of statistical significance. For our study, the ICCs of all key outcome variables were all larger than zero (ICCs = .25 for reading, .32 for mathematics, and .29 for science), suggesting the need for multilevel modelling (Heck & Thomas, 2015).

Subsequently, we tested two models. Model 1 was a two-level SEM without random slopes. This model aimed to test the effects of students' utility value on achievement in reading, mathematics, and science (after controlling for gender and SES effects). In Model 1, the relationship between student-level variables was assumed to be the same across all societies.

Model 2 freed at the student level the effect of utility value on achievement scores by creating three corresponding slope factors (representing the varying effect of student motivation on reading, mathematics, and science, respectively). It tested the predictive effects of societal-level utility value on the three slope factors, essentially a cross-level interaction. If societal-level utility value has a significant effect on the slope factor, it would support our utility-value fit hypothesis. To account for alternative explanations, we also included the Human Development Index (HDI) as a control factor. The full model can be expressed as:

$$
\begin{aligned}
Y_{ij} = {} & \gamma_{00} + \gamma_{01}(\text{Societal} - \text{level utility value}) \\
& + \gamma_{02}\left(\text{HDI}_j\right) + \gamma_{10}(\text{Individual utility value}_{ij}) \\
& + \gamma_{20}\left(\text{gender}_{ij}\right) + \gamma_{30}\left(\text{SES}_{ij}\right) \\
& + \gamma_{11}\left(\text{Societal} - \text{level utility value}_{ij} \times \text{Individual utility value}_{ij}\right) \\
& + \mu_{1j}\left(\text{Individual utility value}_{ij}\right) + \mu_{0j} + r_{ij}, \cdots
\end{aligned}
$$

where Y_{ij} represents the outcome variable (i.e., reading, mathematics, and science); γ_{00} is overall intercept; γ_{01} and γ_{02} represent, respectively, the main effects of societal-level utility value (Societal-level utility value$_j$) and Human Development Index (HDI$_j$) on

achievement; γ_{10}, γ_{20}, and γ_{30} are, respectively, the main effects of student motivation (Individual motivation$_{ij}$), gender$_{ij}$, and SES$_{ij}$ on achievement; γ_{11} represents the cross-level interaction between societal-level utility value and individual-level utility value (Societal-level utility value$_{ij}$ × Individual-level utility value$_{ij}$); and μ_{1j} (Individual-level utility value$_{ij}$), $\mu_{0j,}$ and r_{ij} are the random component.

Compared with previous studies (Bleidorn *et al.*, 2016), our model has the advantage of including the μ_{1j} parameter, without which we would have forced the assumption that the effect of individual utility value on achievement was equal across the 73 societies.

All these models were tested using Mplus 7.4 (Muthén & Muthén, 1998–2015) with Maximum Likelihood Robust (MLR; Satorra & Bentler, 1994) estimator. Evaluation of the ML-SEM model without random slopes (Model 1) was based on the comparative fit index (CFI; Bentler, 1990), root mean square error of approximation (RMSEA; Rigdon, 1996), Tucker–Lewis index (TLI; McDonald & Marsh, 1990), and standardized root mean square residual (SRMR; Shi, Maydeu-Olivares, & Rosseel, 2020). Good fit is demonstrated when the model estimation produces a value not smaller than .95 for CFI and TLI, and a value not larger than .05 for RMSEA and SRMR (Mueller & Hancock, 2010). Comparisons between nested models were based on the deviance test, or the significance test of the adjusted chi-square difference test (Satorra & Bentler, 2010). For detailed procedures, please see the Mplus website (Muthén & Muthén, n.d.).

Results

Preliminary analyses: Descriptive statistics and correlations

The correlations among math, reading, and science achievement scores were high, ranging from $r = .84$, $p < .001$ (between reading and mathematics) to $r = .89$, $p < .001$ (between mathematics and science).

The correlations between individual utility value and achievement were significantly positive with reading ($r = .06$, $p < .001$) and science ($r = .02$, $p < .001$), but not significant with mathematics ($r = .00$, $p = .250$). At the societal level, the correlations between utility value and achievement were all negative: $r = -0.26$, $p < .001$) with reading, $r = -.35$, $p < .001$ with math, and $r = -0.31$, $p < .001$ with science.[1]

The correlations between HDI and all achievement scores were positive, ranging from $r = .30$, $p < .001$ with reading, to $r = .34$, $p < .001$ with mathematics. The correlations between HDI and utility value were negative at both levels: $r = -.11$, $p < .001$ at the individual level and $r = -.45$, $p < .001$ at the society level.

Table 1 shows the relationships among individual-level utility value and achievement in reading, science, and math for each of the 73 societies. Results indicated that across

[1] *The negative correlation between societal-level utility-value level and achievement intercept deserves some comment. More specifically, we found that higher societal-level utility value was associated with lower achievement. Albeit apparently surprising, this finding has been found by previous studies that utilized the PISA data set (Bybee & McCrae, 2007; Lu & Bolt, 2015). Education researchers call this the attitude–achievement paradox which states that countries with high levels of achievement usually have lower levels of motivation as measured by Likert scale questionnaires (Lu & Bolt, 2015). East Asian cultures such as Macau, Shanghai, Hong Kong, Japan, and Korea score very high in terms of achievement but have very low levels of motivation. One explanation for this paradoxical relationship pertains to cultural differences in response style (Bybee & McCrae, 2007). Studies have shown that East Asian students are more likely to use the midpoint of a Likert scale compared to their Western counterparts (Chen, Lee, & Stevenson, 1995). However, it is worth noting that within each of these East Asian cultures, the relationship between individual utility value and achievement was mostly positive demonstrating the importance of utility value in predicting achievement outcomes. Thus, this does not contradict our person–culture fit hypothesis. Given that response style differences are beyond the scope of this paper, we focus mostly on the cross-level interaction (i.e., random slopes), particularly in terms of how societal-level utility-value modifies the relationship between individual utility value and achievement.*

Table 1. Descriptive statistics and correlations within societies

Country/Society	Societal-level utility value *M*	Societal-level achievement *M*			Individual utility value and achievement correlation within each society (*r*)		
		Reading	Math	Science	Reading	Math	Science
Albania	3.42	389.53	379.48	393.53	.33***	.23***	.30***
Indonesia	3.41	403.34	373.72	383.99	.19***	.14***	.18***
Tunisia	3.39	400.30	368.04	397.69	.16***	.11***	.11***
Brazil	3.38	406.39	380.72	401.44	.14***	.09***	.11***
Mexico	3.38	432.81	425.03	420.76	.31***	.26***	.27***
Colombia	3.38	427.52	390.52	411.87	.20***	.16***	.16***
Trinidad	3.36	425.01	420.86	417.13	.26***	.21***	.22***
Venezuela	3.34	441.53	410.01	437.07	.13***	.16***	.11***
Costa Rica	3.32	444.62	409.96	430.21	.15***	.12***	.13***
Portugal	3.31	489.56	487.09	492.48	.17***	.10***	.11***
Moldova	3.31	392.06	400.50	416.86	.23***	.17***	.19***
Kazakhstan	3.30	395.80	409.24	404.74	.26***	.21***	.20***
Panama	3.29	381.76	364.79	380.21	.28***	.25***	.25***
Azerbaijan	3.29	367.81	434.94	380.36	.22***	.12***	.14***
Lithuania	3.29	469.76	477.90	492.33	.08***	.00	.07***
Malaysia	3.29	417.75	408.17	426.29	.26***	.07***	.18***
Kyrgyzstan	3.28	323.85	338.61	337.41	.23***	.20***	.21***
Chile	3.28	454.79	425.72	452.71	.14***	.13***	.14***
New Zealand	3.26	526.73	525.58	538.41	.17***	.16***	.14***
Iceland	3.17	502.73	509.27	496.87	.23***	.20***	.17***
Croatia	3.17	476.54	461.28	487.69	.03***	.01	.02
Jordan	3.17	416.21	395.92	426.63	.26***	.20***	.22***
Denmark	3.16	484.99	490.91	485.69	.19***	.16***	.17***
Canada	3.16	513.66	518.14	520.11	.18***	.15***	.14***
Bulgaria	3.16	435.15	432.08	443.55	.22***	.17***	.17***
Austria	3.15	477.88	502.35	503.64	.02	.04***	.02
United Arab Emirates	3.15	437.79	428.69	444.64	.15***	.11***	.14***
Switzerland	3.14	496.19	530.49	510.01	.07***	.00	.00
Italy	3.14	492.08	490.67	497.13	.09***	.05***	.05***
Finland	3.12	531.78	537.99	549.24	.28***	.21***	.22***
Hungary	3.12	500.30	496.19	508.43	.11***	.08***	.07***
India	3.10	326.63	343.51	339.04	.25***	.20***	.20***
Sweden	3.09	501.60	497.52	498.53	.21***	.18***	.17***
Belgium	3.08	516.73	527.47	520.94	.04***	.01	.02*
Israel	3.07	484.38	454.21	463.86	.02	−.03*	−.02
Germany	3.07	504.57	518.86	528.30	−.01	−.04***	−.05***
Slovenia	3.07	463.66	483.08	493.49	.06***	.00	.02
Netherlands	3.05	520.19	537.70	537.13	.13***	.13***	.12***
Luxembourg	3.04	480.23	496.28	491.99	.04**	.01	−.02
Slovak	3.04	479.36	498.30	493.47	.09***	.05***	.05
Singapore	3.04	523.89	559.45	538.73	.09***	.07***	.10***
Qatar	3.01	374.44	369.86	380.86	.24***	.22***	.22***
Czech	3.01	502.35	517.14	526.05	.07***	.06***	.07***
Liechtenstein	3.00	497.51	534.28	517.86	.11*	−.03	.02

Continued

Table 1. (*Continued*)

Country/Society	Societal-level utility value *M*	Societal-level achievement *M*			Individual utility value and achievement correlation within each society (*r*)		
		Reading	Math	Science	Reading	Math	Science
Serbia	2.99	444.38	443.58	444.13	.10***	.04***	.05***
Norway	2.99	504.95	498.27	500.52	.26***	.24***	.20***
Taipei, China	2.96	498.66	547.17	522.69	.08***	.06***	.07***
Greece	2.96	487.22	468.92	473.52	−.07***	−.11***	−.08
Poland	2.93	506.37	499.92	513.14	.01	−.03***	−.04**
Shanghai, China	2.91	556.14	600.26	575.21	−.05***	−.05***	−.04
Macao, China	2.90	486.85	525.37	510.61	.06***	.04***	.04***
Hong Kong, China	2.89	534.68	556.02	550.48	.07***	.06***	.08***
Japan	2.88	523.61	531.82	542.97	.08***	.07***	.09***
South Korea	2.82	541.19	538.89	539.28	.00	−.03*	−.02

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

most societies, higher utility value was associated with greater achievement in math, reading, and science.

Primary analyses: Multilevel SEM with random slopes

Model 1

We first tested Model 1 without random slopes to examine the effects of individual-level utility value as well as the various covariates on the three achievement outcomes. This model had an excellent fit with the data: TLI = .97, CFI = .99, RMSEA = .010, and SRMRs = .00 (within). We found that individual-level utility-value positively predicted achievement in reading ($b = 20.96$, $p < .001$), math ($b = 16.31$, $p < .001$), and science ($b = 17.53$, $p < .001$) with gender and SES effects controlled for. These results support H1.

Model 2

Next, we tested a model (Model 2) with random slopes in order to test our person–culture fit hypothesis. We freed three parameters (i.e., the three slopes of the individual utility-value effect on achievement outcomes). Person–culture fit hypothesis will be supported if societal-level utility value demonstrated a significant effect on the slope (i.e., cross-level interaction). Model 2 reduced deviance by 171.06 at the cost of 3 degrees of freedom ($p < .001$), suggesting a significantly better fit. We compared Model 1 (scaling correction factor = 41.29; $df = 28$; log-likelihood value = −0.7206355.156) versus Model 2 (scaling correction factor = 27.45; $df = 40$; log-likelihood value = −0.7204696.748). Results of the Satorra–Bentler scaled chi-square difference test were statistically significant (chi-square difference = 171.06, $df = 3$, $p < .001$) indicating that Model 2 with the random slopes fits the data better.

Given that HDI at the societal level is also positively related to achievement, we controlled for HDI at the societal level by including it as a Level 2 predictor along with

societal-level utility value. The diagram for the final model (Model 2: two-level structural equation model with random slopes) is shown in Figure 2. More detailed results are shown in Table 2.

Supporting our person–culture fit hypothesis, the ML-SEM model indicated that across the 73 societies, the relationship between utility value and reading achievement was stronger in societies with higher levels of utility value (b = 51.45, p < .001). These results held after controlling for gender and SES at the individual level and HDI at the societal-level.

These findings were also supported for science achievement wherein the relation between individual-level utility value and science achievement was stronger in societies with higher levels of utility value (b = 43.09, p < .001). Likewise, math achievement showed the same pattern. The relationship between utility value and math achievement was stronger in societies with higher levels of societal-level utility value (b = 39.12, p < .001). These results support H2.

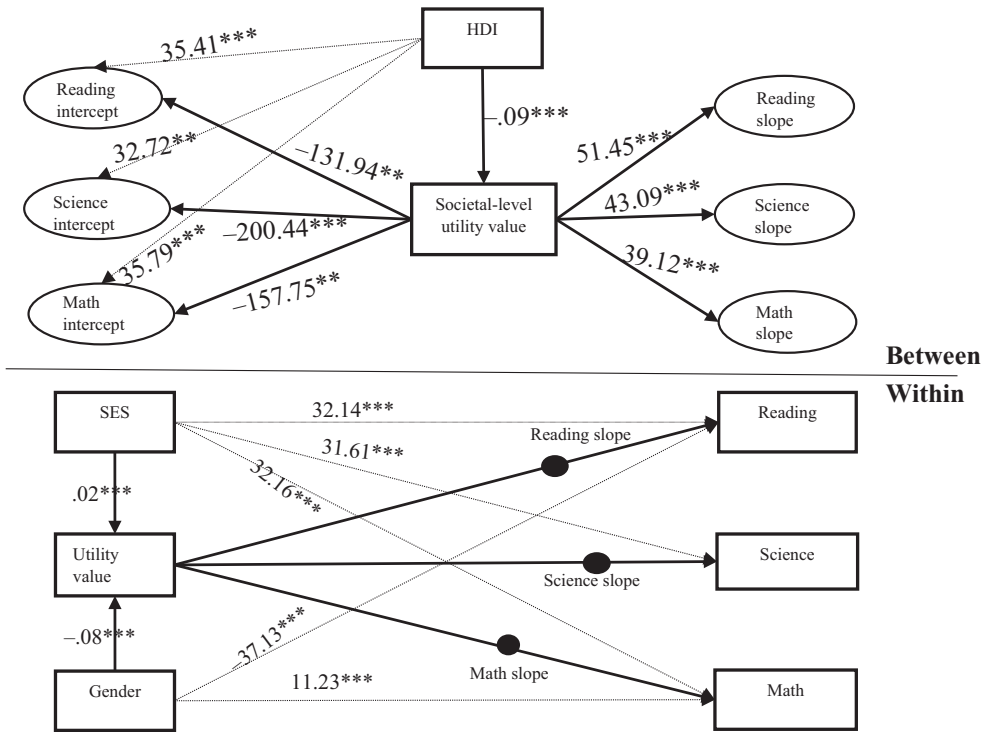

Figure 2. Diagram of the two-level random-slope modelling of person–culture fit in predicting reading, science, and mathematics achievement (with unstandardized estimates).

Note. ** p < .01; *** p < .001; * p < .05; SES = socio-economic status; reading slope, science slope, math slope = random slope of the effect of individual student utility value on reading/science/mathematics score; reading intercept, science intercept, math intercept = intercept factors of reading/math/science at the societal level. The solid dots on the path arrows to test scores represented the slope factors for reading, science, and math, respectively, which corresponded to the three slope factors modelled at the between level. For the sake of simplicity, estimates of covariance are omitted from the diagram.

Table 2. Parameter estimates of the random-slopes SEM for societal-level utility value as a moderator of the relationship between individual utility value and achievement

Level 1 estimates			
	Reading	**Math**	**Science**
SES	32.14*** [30.40, 33.88]	32.16*** [30.15, 34.17]	31.61*** [29.66, 33.56]
Gender	−37.13*** [−39.38, −34.90]	11.29*** [9.57, 13.02]	−0.80 [−3.09, 1.49]
Residual variances	6,796.32*,** [6,534.77, 7,057.87]	6,667.54*** [6,415.27, 6,919.81]	7,022.03*** [6,751.44, 7,292.61]
Level 2 estimates			
	Intercept as outcome (reading)	**Intercept as outcome (math)**	**Intercept as outcome (science)**
Societal-level utility value	−131.95*** [−215.26, −48.64]	−200.44*** [−297.71, −103.18]	−157.75*** [−245.85, −69.65]
Human development index	35.41*** [18.00, 52.82]	32.72** [13.05, 52.40]	35.79*** [17.75, 53.83]
	Slope as outcome (reading)	**Slope as outcome (math)**	**Slope as outcome (science)**
Intercepts	19.90*** [17.60, 22.21]	15.10*** [13.02, 17.18]	16.72*** [14.64, 18.81]
Societal-level utility value	51.45*** [32.24, 70.66]	39.12*** [22.51, 55.73]	43.09*** [25.29, 60.89]
Human Development Index	−0.54 [−3.90, 2.83]	0.28 [−2.82, 3.38]	−0.38 [−3.43, 2.66]
Residual variances	120.57*** [85.47, 155.68]	100.10*** [69.71, 130.50]	102.94*** [74.30, 131.58]

Note. Values in brackets are 95% confidence intervals.
**$p < .01$; ***$p < .001$; slope as outcome = random effect of individual utility value on reading/math/science.

Covariate effects

At the student level, SES significantly predicted achievement scores in all three domains: $b = 32.14, p < .01$ for reading, $b = 31.61, p < 0.001$ for science, and $b = 32.16, p < .001$ for mathematics. Boys had lower reading scores ($b = -37.13, p < .001$) and higher math scores ($b = 11.29, p < .001$). There were no significant differences in science achievement ($b = -0.80$, $p = .570$). These results indicated significant gender effects on reading achievement in favour of girls and on math achievement in favour of boys, whereas gender effects on science achievement were not observed. In terms of covariate effects on individual utility value, the effect of SES was positive ($b = 0.02, p < .001$), indicating trivial variation in students' utility value within each society. The effect of gender on utility value was negative ($b = -0.08, p < .001$), suggesting that boys had slightly higher levels of utility value than girls.

Discussion

The overall aim of this study was to examine how utility value predicted student achievement and whether person–culture fit in utility value was associated with greater motivational payoffs. Results supported our hypothesis. Higher levels of utility value were associated with higher achievement (H1). More importantly, in societies where people generally value schooling, individual-level utility value was associated with better achievement outcomes (H2). These results held after controlling for individual-level covariates such as gender and socio-economic status as well as societal-level characteristics such as HDI. The positive effects of utility-value fit were robust across the three domains of achievement: math, reading, and science providing further support to our hypothesis.

Our findings extend the motivational literature by highlighting the importance of person–culture fit. Prior motivation research has overwhelmingly focused on the main effect of motivation at the individual level. Lewin (1936) highlighted that one of the challenges psychologists must surmount is the integration of areas across different levels of analysis (cultural, historical, sociological, psychological, physical). Our study attempts to tackle this challenge by integrating different levels of analysis from the societal level to the individual level to shed light on the role of person–culture fit in motivation, specifically in terms of utility value.

Our study is also the first to show that the motivational payoffs vary as a function of the societal context thereby extending previous research which has mostly looked at motivation as an individual-difference variable. The results of our study corroborate existing evidence on the importance of person–culture fit on optimal outcomes (Fulmer *et al.*, 2010; Jokela *et al.*, 2015). Previous studies have focused on personality traits and socio-demographic characteristics (Bleidorn et al., 2016), and our study extends these findings to the domain of utility value.

What can account for the positive effects of person–culture fit in utility value? It is plausible that students whose utility-value matches the utility value of their peers in the larger societal context may feel a greater sense of validation and experience lower levels of uncertainty. These ideas are consistent with psychological theories that emphasize the importance of interpersonal belonging (Baumeister & Leary, 1995). Another possibility is that when one's motivational orientation is congruent with the society's motivational orientation as is the case when a student perceives schooling as important in a context where other students share the same perception, they might experience higher levels of social support thereby reducing obstacles to goal attainment.

We also found that within each society, utility value was mostly associated with higher levels of achievement. The correlations, in general, were all in the positive direction supporting expectancy–value theory's classic assumption regarding the importance of utility value. The effect sizes albeit small are in line with what previous meta-analytic studies have found for motivational constructs (Hattie, 2009; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). We enrich expectancy–value theorizing by demonstrating the importance of moving beyond an exclusive focus on student-level variables and by taking societal context into account. Though high levels of utility value in and of itself predict greater achievement, even better motivational payoffs are accrued when one is embedded in a society that values schooling as well.

The findings of the current study corroborate recent arguments for a system approach to the study of motivation. As Dunning (2016) eloquently stated, 'The dynamics of motivation do not rest solely within the organism. Nor do they live solely in the situations that may trigger them. Instead, motivations work within the interplay between organism and situation. Thus, to understand how motivations direct human behavior, one does not want to look towards the human, nor towards the environment that the human is in. Rather, the unit of analysis, the "thing" to pay attention to directly, is the human-environment system. . .' (pp. 27–28).

Limitations and directions for future research

This study has several strengths including its large sample size, cross-national data set, and the use of sophisticated statistical techniques (multilevel random-slopes SEM). However, despite its strengths, there are some key limitations. First, we used country/society as a proxy for culture in this study. Although this is a common approach in cross-cultural and socio-ecological psychology, culture can also be operationalized in different ways (e.g., religion, social class, region; Cohen, 2009). Future studies can consider alternative ways of operationalizing culture depending on the research questions being investigated. Second, in measuring societal-level utility value, we averaged students' utility-value endorsements in a whole society. However, it is important to note that within one society, students vary to a great extent in terms of their utility value. Within-culture heterogeneity is greater than between-culture differences (Matsumoto et al., 2001), and researchers must keep this in mind to avoid succumbing to simplistic cultural stereotypes.

Third, we used a cross-sectional design which prevents us from making causal conclusions. Though we posit person–culture fit as a predictor of motivational payoffs, it is also possible that greater achievement outcomes may make students value schooling more suggesting an alternative causal pathway. Future studies may also need to conduct follow-up studies to determine whether person–culture fit has a long-term impact on achievement. Fourth, we were unable to investigate the specific mechanisms that mediated the effects of person–culture fit on the link between utility value and achievement. Future studies could test several potential mediators such as social support, sense of belonging, or goal facilitation. Unpacking the theoretical mechanisms that could explain why and how person–culture fit leads to greater achievement returns to utility value would help advance the nascent literature on person–culture fit in the educational context and enhance theoretical precision.

Fifth, we only focused on the construct of utility value. However, student motivation is a multidimensional construct and researchers can explore whether person–culture fit effects could also be found for other motivational factors (e.g., intrinsic motivation, growth mindset, attainment value). Last, we used existing PISA items to approximate the

construct of utility value. Future studies that do not rely on secondary data sets might use more well-validated measures of utility value developed by expectancy–value researchers.

Conclusion

Beyond just focusing on motivation and utility value as properties of the individual student, educational psychologists may benefit from zooming out and looking at the broader socio-cultural environment. What matters is not just one's utility value but also how much other people in one's context value schooling. This finding underscores the view that a full account of motivation and learning would be incomplete without properly attending to the role of the broader socio-cultural context.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Ronnel B. King: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – original draft. Yuyang Cai: Conceptualization, Methodology, Writing – original draft. Hongfei Du: Writing – review & editing.

Data availability statement

The data that support the findings of this study are available in OECD PISA Database at https://www.oecd.org/pisa/data/pisa2009database-downloadabledata.htm

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