Are higher-order life values antecedents of students' learning engagement and adaptive learning outcomes?

The case of materialistic vs. intrinsic life values

Cite this article:

Abstract

Materialistic values have been shown to have a negative effect on learning. As intrinsic life values such as self-acceptance are orthogonal to materialistic values, they may counteract the effects of materialism and benefit the learning process by encouraging a focus on the actual learning task itself, as opposed to emphasizing the rewards associated with learning (e.g., school grades). Therefore, we tested the hypotheses positing these two higher order life values as antecedents of engagement with the learning process, *and* of important learning outcomes, including actual academic performance. A total of 345 university students of Chinese ethnicity (211 females; mean age = 18.89, *SD* = 1.35) participated in two studies that utilized a three-wave longitudinal design over a three-month period. The main variables tested were materialistic values, intrinsic life values, engagement with learning, and actual performance (in a writing task in Study 1, and in a formal assessment, i.e., final exam, in Study 2). Results showed that materialistic values were longitudinally and negatively related with exam performance, but not with engagement with learning. In contrast, intrinsic life values longitudinally predicted engagement with learning, and had a positive direct effect on performance on the writing task (Study 1), and a positive indirect effect on final exam performance (Study 2). The results highlight an important, if underutilized method of improving the learning process.

Keywords:

Recent research (King and Datu 2017; Ku et al. 2012; 2014) has demonstrated a negative impact of materialistic values on the learning motivation and learning outcomes of school-age children and adolescents. These findings help raise awareness of the importance of considering values as an area of influence on the learning process, and hence, potentially creating a new pathway for the study of learning motivation and behaviours. In addition, they raise an important question: do higher order life values other than materialism encourage, instead of simply impede, learning? Self-determination theory (SDT) suggests that intrinsic values are inherently satisfying, and as a result, correlate with well-being, in contrast to what is observed with extrinsic values, which are contingent upon external validation (Ryan and Deci 2000). Research on values orientation and life goal contents has also shown that materialistic values, such as aspirations for financial success, are orthogonal to intrinsic values such as self-acceptance (Grouzet et al. 2005). Thus, if materialistic values are indeed detrimental to learning, it is reasonable to infer that intrinsic life values may potentially benefit learning. Of note, this also represents a question with considerable societal implications, because an increasing volume of research finds not only intra-individual benefits of intrinsic life values via an influence on variables such as vitality and well-being (e.g., Deci and Ryan 2008; Guertin et al. 2017; Schmuck et al. 2000), but also on the likelihood of a broad range of pro-social behaviours (e.g., Ku and Zaroff 2014; Sheldon and Krieger 2004 ; Unanue et al. 2016). If intrinsic life values are indeed predictive of adaptive learning motivations and behaviours, the promotion of such values within a school environment is clearly indicated, as a means of promoting both learning and overall well-being. Therefore, the present research examines whether higher-order life values (i.e., intrinsic values, and materialistic values) are antecedents of engagement with the learning process, *and* of important learning outcomes including actual academic performance.

Higher-order Intrinsic Life Values and Learning

The intrinsic life values tested in the current study *differ conceptually* from the intrinsic learning goals/values/motivation that have been previously and extensively studied in the learning literature. Intrinsic learning motivation is defined as a "motivation to engage in an activity for its own sake, whereas extrinsic motivation refers to motivation to engage in an activity as a means to an end" (Linnenbrink and Pintrich 2002, p. 318). In the learning literature, there is a large array of evidence to show that learners who are more intrinsically motivated tend to response to school and schoolwork more positively than those who are less intrinsically motivated (see Pintrich and Schunk 2002, for a review). Intrinsic [learning] motivation, however, differs from intrinsic life values. According to Verplanken and Holland (2002), *values* are important components of an individual's self-concept and self-identity. As such, values have important implication for both motivation and behaviour. Indeed, when values are experimentally activated, individuals subsequently adopt decisions and behaviours congruent with these values (e.g., Sagiv et al. 2011; Verplanken and Holland 2002).

Whereas the benefits of intrinsic learning goals and/or motivation on learning have been clearly demonstrated, little is known about the effects of higher-order intrinsic life values on learning. Preliminary, if nonconclusive evidence of this relationship does exist, however. Thus, Jones (1990) investigated the relationship between the values held by student upon university entry and their subsequent academic achievement two years later. Students endorsing a value system that could be labelled as intrinsic in nature (e.g., emphasizing the development of inner harmony, meaningful relationships with others, and open-mindedness) enjoyed more academic success than those students whose value systems were less intrinsic (e.g., geared towards accumulating material comfort, pleasure-seeking, and the development of conventional relationships with others). Furthermore, Henderson-King and Mitchell (2011), in exploring the relationship between life values and the perceived meaning of

education, found that intrinsic life values (i.e., self-acceptance, affiliation, and helping others) were the only ones associated with a belief in learning as the aim of university attendance.

Materialism and Learning

Materialism is predominantly defined as a value orientation emphasizing the importance of money and material possessions in the achievement of happiness, in the manner in which success is defined, and in the ways in which goals are prioritized (Richins and Dawson 1992; Richins, 2004). An impressive line of research has documented a negative relationship between a materialistic orientation, and various aspects of well-being (see Kasser 2016 for a review). Given that academic institutions act in synchrony with the broader culture at large in socializing students toward mainstream cultural values and goals (Boykin et al 2005), one could query whether the deleterious effects of a materialistic orientation extend to the learning context, affecting students' learning behaviours, and potentially as a result, learning outcomes, including academic performance levels.

Ku and colleagues (Ku et al. 2012, 2014) were the first to examine the materialism/ learning connection. They recruited children from nine to 11 years of age (Ku at al. 2014), and adolescents from 14 to 17 years of age (Ku et al. 2012), and incorporated cross-sectional, longitudinal, and experimental designs across two different cultures (i.e., U.K. and Hong Kong). They found a negative relationship between materialistic values and school grades, mediated by lower mastery goals (i.e., to improve competence) and higher performance goals (i.e., to demonstrate competence). Experimental priming of materialistic values negatively impacted the adoption of mastery goals, while a materialistic orientation predicted a subsequent deterioration in academic performance. These findings were subsequently replicated in secondary school students in the Philippines (King and Datu, 2017), in whom materialism longitudinally predicted lower school grades, a relationship partially mediated by amotivation.

With clear evidence of the relationship between materialism and learning motivation and academic performance, the question becomes whether this relationship can be extended to an older group of learners who possess different motivations for learning and different effects of such learning motivation on subsequent academic performance, i.e., university students. For example, research in achievement goals theory has documented the potentially positive effect of performance-approach goals on learning for university students; in contrast, such goals tend to have negative learning effects in school-age learners (Midgley et al. 2001). Deci, Koestner and Ryan's (1999) meta-analysis of studies from 1971 to 1997 also demonstrated that university students' learning motivation was less affected by extrinsic rewards compared to school-age children and adolescents. Given that some research suggests an increase in materialism in childhood, a peak in early adolescence, and a subsequent decline from middle to late adolescence (Chaplin and John 2007), it is also plausible to suggest that university students are less susceptible to the influence of materialistic values relative to their younger counterparts.

However, there are reasons to believe that materialism as a value system is very much relevant to university students, both more broadly, and to learning in particular. Large archival data from the US suggests increasing popularity of materialism as a value system, beginning in the 1980s in 12th grade students (Twenge and Kasser 2013), university students (Astin 1998) and in the general public at large (Bartolini and Sarracino 2017). As far as we are aware, there is no comparable time series data gauging the level of materialism among students in China, a population from which our current samples were drawn. Nonetheless, various recent research comparing students in China to those in other countries find a greater level of endorsement of materialism in comparison to samples from the US (Podoshen et al. 2010; Wei and Talpade 2009) and Canada (Ogden and Cheng 2011). Initial cross-sectional data in this area, with university students in the Philippines (King, 2018), demonstrated lower

levels of self-reported academic engagement in those students reporting greater levels of materialism. Given the large amount of resources typically devoted to university students and their studies, a more intensive and refined inspection of the manner in which these resources are allotted is warranted. Thus, the present research utilizes university student samples, and examines whether materialism holds similar effects in this group of learners.

The Present Research and Hypotheses

The purpose of the present research was to examine the role higher-order life values play in university students' learning. To this effect, we conducted two studies with university students in Macao, a Special Administrative Region (SAR) of China. To control for exogenous factors, only students of Chinese ethnicity enrolled full-time in undergraduate study were recruited. An age range of 18 to 25 years was established to further ensure sample homogeneity. No other inclusionary/exclusionary criteria were used.

Two studies were conducted utilizing a three-wave longitudinal design, encompassing a full academic term (approximately three and a half months, from September to mid-December). The main variables tested were materialistic values, intrinsic life values, engagement with learning, and performance. The definition of materialistic values followed that established by Richins and Dawson (1992), who defined these as a value orientation greatly emphasizing money and material possessions as a means of achieving personal happiness, success, and life goals (Richins and Dawson 1992; Richins 2004). For intrinsic life values, we adopted Kasser and Ryan's (1996) operationalization of SDT's intrinsic goals, defined in part as self-acceptance, affiliation, and helping others. For engagement with learning, we followed Vansteenkiste and colleagues' (2005) work and focused on students' involvement with learning tasks. Last of all, we used actual performance as an indicator of learning outcomes. In Study 1, we evaluated participants' performance on a writing task, and

in Study 2, we collected participants' performance on a formal assessment – the end of term (i.e., final) examination.

We hypothesized that higher-order life values (i.e., materialistic values and intrinsic life values) at the beginning of the academic term would predict involvement with learning tasks in the middle of the term, which would then longitudinally predict actual performance at the end of the term. Specifically, we posited that materialistic values would have a negative relationship with task involvement (Hypothesis 1), whereas intrinsic life values would have a positive relationship with task involvement (Hypothesis 2). We also hypothesized mediated relationships between values and academic performance via task involvement. It was thus hypothesized that a materialistic values orientation would have negative indirect effects on performance (Hypothesis 3), while intrinsic values would have positive indirect effects on performance (Hypothesis 4).

Study One

Method

Participants and procedures.

One hundred and sixty-eight students of Chinese ethnicity participated in the study in exchange for course credits. All participants resided in Macao and were enrolled in an introductory psychology course in a public university at the time of the study. Nine students missed the second wave of data collection and five did not hand in the writing task at the end of the academic term. These students were removed from the analyses. Hence the final sample size was 154 students (*Mean age* = 18.89, *SD* = 1.35; 94 females).

In the beginning of the academic term, participants completed an online questionnaire consisting of items measuring materialistic values and intrinsic life values, and also simple demographic data including age, sex, and length of residence in Macao. Approximately eight

weeks later, participants completed a measurement of task involvement. Another week later, students were given an opportunity to earn two extra course credits by completing an optional assignment on social psychology, one of the core components of the course. All students received standard instructions based on those used in Iyengar and Lepper's (2000, p. 998) study:

> Next week, as part of the lecture series on social psychology, a movie "Twelve Angry Men" is going to be shown in [venue] on [date] between [time]. All students on the Introduction to Psychology course are required to watch it. You can earn two extra credit points on the course if you write a response paper after watching the movie. You should apply theories of persuasion and minority influences, as discussed in Lectures [numbers and dates], to the story plot in your response paper. There is no word limit requirement, but we expect papers to be approximately two pages long, typed and double spaced. It is due at the end of the term on [date].

The movie requirement was first announced in classes in Week 8. Course instructors gave identical verbal descriptions of the assignment. At the end of the term, students' assignments were collected.

Measures.

Materialistic values.

Richin and Dawson's Material Values Scale (MVS; 1992) has been widely used in psychological and consumer research studies on materialism (see Dittmer at al. 2014 for a discussion of different conceptualizations and measurements of materialism). Since the reverse-worded items in the original scale may cause difficulty with participants from non-English speaking countries (Wong et al 2003), we utilized the six-item short scale developed and validated by Richin (2004), which omits reverse worded items. The six items were first translated from English to Chinese by the first author, and then back-translated by a bilingual post-graduate student who was blind to the purpose of the present study. The translated items were further assessed for legibility by three undergraduate psychology students of Chinese ethnicity. The six-item scale measured the three facets of materialism, namely: centrality ("My life would be better if I own certain things that I don't have"), success (e.g., "Some of

the most important achievement in life include acquiring material possessions"), and happiness ("I'd be happier if I could afford to buy more things"). Participants indicated how much they agreed with each statement on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). The Cronbach's α in the present study was .80 (*Mean* = 3.61, *SD* = .89).

Intrinsic life values.

We used the intrinsic life goals from Kasser and Ryan's (1996) Aspiration Index to measure intrinsic values. Participants rated the importance of three life goals – self-acceptance ("Knowing and accepting who you really are"); affiliation ("Having friends that you can rely on"); and community ("Helping others in need") on a six-point Likert-type scale (1 = *not at all important,* 6 = *very important*)*.* The Chinese version was translated by Ku and Zaroff (2014) and used in their studies with university students and community-dwelling adults of Chinese ethnicity in Hong Kong, a neighbouring Chinese SAR, with good reliability and validity. Cronbach's alpha in the present study was .76 (*Mean* = 3.90, *SD* = .58).

Task involvement.

Following Vansteenkiste et al. (2005), we measured task involvement with five items taken from a previously validated questionnaire on achievement goals (Anderman et al. 2003). The Chinese version was translated and utilized by Ku et al. (2012, 2014) in studies of the learning processes displayed by children and adolescents of Chinese ethnicity residing in Hong Kong. In order to instruct participants to consider their intention for the remainder of the term, we changed the stem from "studying this course" to "in the rest of the academic term." Participants indicated how much they agreed or disagreed, on a 6-point Likert-type scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), with statements such as "In the rest of the academic term, it is important to me that I learn a lot of new concepts" (α = .88; *Mean* = 4.69, *SD* = .75).

Task performance.

Students' essays on the "Twelve angry men" were used as an indicator of task performance, and were graded by three graduate teaching assistants. The assistants were fully blind to the nature of the study, and were randomly assigned an approximately equal number of essays. They graded the quality of the essays based on each student's understanding and application of theories, as well as on the general quality of the writing. All essays were graded on a 6-point scale, ranging from 0 (*very poor*) to 5 (*excellent*). Since each essay was graded by two graduate assistants, we tested for inter-rater reliability by running Cohen's kappa. Results showed considerable agreement across the graders – K (49 valid cases) = .71, $p < .001$ between grader 1 and 2; K (54 valid cases) = .75, $p < .001$ between grader 1 and 3; and K (51 valid cases) = .68, $p < .001$ between grader 2 and 3 – therefore their ratings were averaged, yielding one score per student (*Mean* = 3.01, *SD* = 1.53).

Results

Table 1 shows all of the zero-order correlations between the main variables and the demographic variables. Materialistic values were negatively correlated with task involvement, $r = -.23$, $p = .01$, but not with task performance, $r = -.14$, $p = .08$. Intrinsic life values were positively correlated with both task involvement, $r = .35$, $p < .001$, and with task performance, $r = .34$, $p < .001$. To evaluate the role of values on learning together, and also to test for mediation effects, we conducted path analyses. We evaluated two competing models – a full mediation model (Model 1) based on our a priori theorization, and a partial mediation model based on the results from the zero-order correlations. In Model 1, materialistic values and intrinsic life values were predictors of task involvement, which in turn predicted task performance. Age and gender were included as control variables and were modelled to predict both task involvement and task performance. Model 2 retained all the paths in Model 1, but a direct path was added between intrinsic life values and task performance.

Chi-square change statistics indicated that the additional direct path from intrinsic life values to performance significantly improved the model fit, $\Delta X^2(1) = 8.542$, $p = .003$, suggesting that Model 2 (i.e., a partial meditation model) fit the data better than Model 1. Fit indices for Model 2 were good: $X^2(3) = 5.542$, $p = .136$, CFI = .979, RMSEA = .074 (.000, .171), SRMR = .041. Intrinsic life values were the only significant predictor of task involvement, $\beta = .29$ $p = .01$ (95% confidence interval based on the bias-corrected percentile method with 500 bootstrap samples = .13, .43). Intrinsic life values also had a direct effect, $\beta = .23$ (95% CI = .10, .35), and an indirect effect, $\beta = .09$, $p = .01$ (95% CI = .03, .15), on task performance. Therefore, the total effect of intrinsic life values on task performance was $\beta = .32$, $p = .02$ (95% CI = .16, .42). Materialistic values did not significantly predict task involvement, nor task performance. On the whole, the model explained 13.2% of the variability in task involvement (95% CI = .08, .23), and 19.5% in task performance (95% CI = .12, .35). Table 2 shows all the standardized direct, indirect and total effects (with 95% CI) of the two higher-order values and two control variables on task involvement and task performance.

Study Two

The findings from Study 1 suggest that even though materialistic values may be negatively related to university students' learning, the strength of this relationship was reduced when intrinsic life values were considered. While these results give support to the contention that intrinsic life values not directly related to learning can nonetheless facilitate learning, it remains to be tested whether these values may have a relationship with actual academic performance. As students in Study 1 were told that the extra-credit assignment would not be graded, it is possible that their performance on this assignment may differ from their performance on a formal assessment. Furthermore, given that materialism appears to

orient learners towards tangible rewards such as grades (Ku et al. 2014), it is possible that students who are high on a materialistic values orientation continuum responded differently on a non-graded assignment relative to how they may respond when informed that their work will be formally assessed. Hence, in Study 2, we attempted to further evaluate the relationship between higher-order values and learning, but used examination scores as a measure of performance. In order to control for other individual differences such as ability, we collected participants' scores on two examinations – the mid-term and the final examination. We used the final examination as a measurement of academic performance, and the mid-term examination as a control measure gauging against individual differences in ability. We also asked participants to evaluate the difficulty level of the mid-term examination, and to evaluate their own performance. These measures were used as controls for individual variations in confidence and self-perceived ability.

Method

Participants and procedure.

Two hundred and fifteen students of Chinese ethnicity participated in the study. Like in Study 1, all participants were full-time students residing in Macao, and enrolled in an introductory psychology course in a public university at the time of the study. Twenty students missed the second wave of data collection and four did not hand in the consent form enabling collection of their examination scores, and these students were excluded from further analyses. The final sample consisted of 191 participants (*Mean age* = 18.81 years, *SD* =1.27; 117 females). In the beginning of the academic term, participants completed an online questionnaire measuring materialistic values (Richins, 2004) and intrinsic life values (Kasser and Ryan 1996) in addition to surveying demographic data. Approximately two months later, immediately after a mid-term examination (Exam I), participants completed a short questionnaire asking them to evaluate the difficulty level of the examination (from 1 = *not at*

all difficult, to 6 = *very difficult*), and to rate their confidence in their own performance (from 1 = *not at all confident*, to 6 = *very confident*). Afterwards, they answered the same five items that measured task involvement in Study 1. Another two months later, at the end of the term, participants completed the final examination (Exam II). Scores from both examinations were collected from course instructors after participants gave their informed consent.

Measures.

All variables apart from academic performance were measured on a six-point Likert-type scale. As in Study 1, materialistic values were measured by Richin's (2004) six-item Material Value Scale (α = .81; *Mean* = 3.52, *SD* = .82), intrinsic life values by nine items from Kasser and Ryan's (1996) Aspiration Index (α = .82; *Mean* = 5.01, *SD* = .54), and task involvement by five items from Anderman et al.'s achievement goals scale (2003) (α = .88; *Mean* = 4.99, *SD* = .70).

Academic performance.

Participants' academic performance was measured by their performance on the end of term examination in an introduction to psychology course. This examination (Exam II) formed part of the formal assessment for the course. All students enrolled in the course completed the same examination, which constituted 40% of the final grade for the course. As such, students received a score between 0 and 40 for the examination, depending on how many questions they answered correctly. In order to control for individual differences in ability that were not a focus of the present study, we collected participants' scores on the mid-term examination (Exam I) after gaining their informed consent and used these scores as a control measure of academic performance.

Results

Almost all students (93.4%) found the mid-term examination difficult, and most students (67.3%) were not confident about their performance. These ratings suggested that

Exam I was a challenging academic event for the participants. Responses to challenges often vary across individuals due to various reasons such as perceived ability, and these may in turn lead to different outcomes, including performance (Chemers et al 2001; Valentine et al 2004). Indeed, participants' evaluations of the mid-term examination were significantly correlated with their actual performance in both Exam I and Exam II. Hence these evaluations were included in all subsequent analyses as control variables.

Partial correlations controlling for perceived difficulty level of Exam I and confidence about one's performance showed that materialistic values were negatively correlated with task involvement, $r = -.15$, $p = .04$, and with Exam II, $r = -.15$, $p = .04$. Intrinsic life values, on the other hand, were significantly and positively correlated with task involvement, $r = .31$, $p < .001$, but not with Exam II, $r = .07$, $p = .31$. Table 3 contains all the partial correlations.

Based on our a priori hypotheses we tested a full-mediation model (Model 1), and, based on the results of the correlations, two partial mediation model (Models 2 & 3). In Model 1, materialistic values and intrinsic life values were modelled to predict task involvement, which then predicted examination performance. Age, gender, perceived difficulty level of Exam I, and confidence in one's performance on the examination were all included as control variables and modelled to predict both Exam I and Exam II. Exam I was modelled to predict Exam II. Model 2 retained all the paths in Model 1 but added an additional direct path from materialistic values to Exam II. Model 3 retained all the paths in Model 2, but added another direct path from intrinsic life values to Exam II.

Chi-square change statistics showed that Model 2 fit the data significantly better than the full mediation model, $\Delta X^2(1) = 5.60$, $p = .02$. Adding the direct path from intrinsic life values to Exam II (i.e., Model 3) however, did not improve the model fit, $\Delta X^2(1) = .021$, $p = .88$. Model 2 was therefore adopted. Fit indices of this adopted model were good: $X^2(21)$

22.105, $p = .393$, CFI = .997, RMSEA = .017 (.000, .066), SRMR = .051. Materialistic values did not significantly predict task involvement, but did negatively predict performance on Exam II, $\beta = -.09$ (95% CI = -.08, -.15). The mediated relationship between materialistic values and Exam II was not significant, but the total effect of materialistic values on Exam II was negative and significant, $\beta = -.11$, $p = .03$ (95% CI = -.18, -.03). Intrinsic life values predicted task involvement, $\beta = .27$, $p = .01$ (95% CI = .13, .37), and had an indirect effect on Exam II, $\beta = .07$, $p = .01$ (95% CI = .04, .11). Together, the model explained 8.4% of variability in task involvement (95% CI = .03, .16), and 75.3% in performance on Exam II (95% CI = .70, .81). Table 4 shows all the standardized direct, indirect and total effects on task involvement and on Exam II.

General discussion

The current research set out to test for the possible effects of higher-order life values on learning in two longitudinal studies with university students. Results from both studies suggest that the negative relationship between materialism and learning that has been observed among younger learners may also exist among university students. In Study 1, materialistic values were longitudinally and negatively correlated with task involvement, whereas in Study 2 these values were negatively correlated with both task involvement and examination performance. When materialistic values were evaluated along with intrinsic life values in path models, however, they retained a significant relationship with examination performance but not with task involvement. Taken together, the findings support Hypothesis 1, but reject Hypothesis 3, in that materialistic values were negative antecedents of learning, but the negative relationship between these values and academic performance was not mediated through the pathway of task involvement. On the other hand, intrinsic life values predicted task involvement in both studies. They also had direct and indirect effects on

performance on a writing task in Study 1, and an indirect effect on exam performance in Study 2. Hypotheses 2 and 4 were therefore supported in that intrinsic life values were significant antecedents of adaptive learning and actual performance, and their effects went above and beyond that of materialistic values.

The negative relationship between materialistic values and adaptive learning motivation, such as mastery goals, has been previously found among school-aged children and adolescents across cultures (King and Datu 2017; Ku et al. 2012, 2014). Among university students, self-proclaimed materialists have also been found to report a lower level of academic engagement (King 2018). While our findings corroborated the negative effect of materialism on learning, task engagement was not found to mediate this relationship. Thus, the mechanism by which materialism exerts this effect is unclear. However, there is evidence that the nature of the learning motivation, i.e., performance-related motives, may underline this relationship. In a very recent study examining the relationship between life values and learning, Janke and Dickhauser (2019) found that students who endorsed the extrinsic values of money, fame and image (values considered by many as representative of a materialistic orientation, see Dittmar et al. 2014 for a discussion on the various conceptualizations of materialism) were more likely to adopt performance approach goals than the more intrinsically oriented students. While we could not rule out the possible mediating roles of performance goals, it is important to note that data from achievement goal research is not definitive. Thus, on the one hand, performance-related goals may evoke test anxiety and negative emotions regarding task learning. On the other hand, however, performance-related goals also frequently predict performance, especially among older learners such as university students (see Huang 2011, and Midgley et al. 2001 for meta-analyses).

Another possible mechanism by which materialism may compromise performance is regulation. SDT conceptualizes three categories of regulation: autonomous regulation,

controlled regulation, and amotivation (Deci and Ryan 2000). Ratelle et al. (2007) demonstrated that different combinations of various types of regulations had different effects on university students compared to those observed in younger learners. Specifically, university students with high levels of autonomous regulation but low levels of other types of regulations were the most persistent in their learning. Compared to all other students, they were also the most likely to persevere in their academic program. As materialism involves a strong orientation towards tangible rewards, materialistic students are likely to adopt a more controlled regulation in their learning. Compared to the more intrinsically oriented students, these students are also more likely to give up on their learning, and as a result, perform worse on a final examination.

The unexplored mediating role of controlled regulations (and their relationship with task persistence) also point to a potential limitation of the current research. Most participants in Study 2 found Exam I rather challenging, and thus, it was not possible to examine the relationship between materialism and task involvement in participants who were *not* in a challenging situation. That is, would the more materialistic students perform better in Exam II if they did not encounter difficulties earlier in the term on Exam I? Furthermore, in previous studies demonstrating a mediated relationship between materialistic values and performance (e.g., Ku et al. 2012, 2014), the mediators were achievement-related motivations. Achievement motivations and engagement with learning are related and potentially overlapping constructs that predict learning outcomes, but they are also ultimately distinct constructs with motivation conceptualized as temporally preceding engagement (Martin 2012) as the behavioral pathway through which motivation influences learning outcomes (Reeve et al. 2004). Future longitudinal studies incorporating more comprehensive measures of motivations and engagement, and evoking more diverse sets of learning situations are needed to further the understanding of the underpinnings of the materialism/learning relationship.

The negative effect of materialism on learning leads to the important question of how such effects can be curtailed, and conversely, how learning can be enhanced. Grouzet et al. (2005) showed that goal contents are organized along an intrinsic versus extrinsic dimension. If materialism, an extrinsic life goal, is negatively related to learning, then it stands to reason that intrinsic values should be conductive to learning. Indeed, our findings with university students support this hypothesis. Higher order intrinsic life values of relatedness, self-acceptance and community were positively and longitudinally related to engagement with learning, as well as with actual performance, above and beyond the effects of materialism. It is important to note that the pressure to assume an extrinsic goal orientation in the academic arena may be greater in Chinese societies, in which examination results may be emphasized far more so than is learning for learning sake, as a path towards university acceptance and subsequent financial success (Shek et al. 2011). Nonetheless, even against this backdrop, the benefits of intrinsic life values were clearly evident via relationships with task engagement, and crucially, with actual academic outcomes. Thus, it behooves education researchers to remain cognizant of factors that at first glance may not seem relevant to the learning process. It is suggested herein that efforts be made to, at minimum, consider the influence of intrinsic life values on academic achievement, and optimally, consider how to incorporate such values into the learning climate in higher education. This is of particular importance when consideration is given to the adaptive influences of intrinsic life values on a large number of diverse and seemingly unrelated outcomes -- body image satisfaction (e.g., Mask and Blanchard 2011), pro-environmental attitude and behaviour (e.g., Ku and Zaroff 2014), unethical decision making and cheating behaviour (e.g., Feldman et al. 2015), and work motivation and job outcomes (e.g., Vansteenkiste et al. 2007).

Self-determination theory proposes that humans have a natural tendency and capacity for mastery and ability development, and so the theory has implications regarding the

potential for high-quality volitional learning (Deci and Ryan 2000; Niemiec and Ryan 2009).
It is also wholly consistent with earlier arguments concerning the importance of social goals
or social motives in various types of educational outcomes (e.g., Urdan and Maehr 1995).
Empirical evidence has demonstrated that, at least in secondary school students, high needs
for affiliation are associated with stronger performance in a cooperative learning condition
relative to an individualized condition (Klein and Pridemore 1992). Adolescents experiencing
conflicting pulls from their social motives and achievements motives were able to resolve this
conflict in learning tasks allowing for non-competitive and cooperative learning strategies
(Phelan et al. 1994). In various studies with Asian students (Hong Kong Chinese and
Filipino), King and colleagues (King et al., 2012; 2013; King and McInerney, 2019) have
shown that social concern goals, social responsibility goals, family-support goals, and to a
lesser extent, social affiliation and social status goals, are associated with academic
engagement and achievement. The current research adds to this literature and supports the
relevance of non-achievement focused goals and needs in the educational context. To support
and satisfy students' needs for self-acceptance, relatedness and community, it is essential to
create a supportive learning environment. Opportunities for academic activities encouraging
both skills development *and* also interaction with fellow classmates and teachers assume
greater importance in this context (Filak and Sheldon 2003). Thus, while it is important to
provide resources to the extent necessary to allow students to succeed in their self-directed
learning (Mann and Robinson 2009), other more altruistic goals should be encouraged as
well.

In summary, the current results build upon and extend recent work in children and
adolescents in revealing the potential influence of values on individual-level trends in
academic performance in university student samples. In light of the extant literature, these
relationships appear robust and resilient to both individual level factors such as age, and to

school-level variables. In short, the results further argue for a greater consideration of life

values in the study of education.

Table 1

Means (SD) and zero-order correlations between demographic and main variables (Study 1)

	M (SD)	2	3	4	5	6
1. Age	18.89 (1.35)	-.16	-.01	-.14	-.17*	-.13
2. Gender [a]	--		-.25**	.17*	.15	.09
3. Materialism	3.61 (.89)			-.57***	-.23**	-.14
4. Intrinsic life values	3.90 (.58)				.35***	.34***
5. Task involvement	4.69 (.75)					.39***
6. Task performance	3.01 (1.53)					

Notes. [a] males = 1; females = 2.

* $p \le .05$; ** $p \le .01$; *** $p \le .001$

Absolute values of correlations represent their effect sizes (Cohen, 1992).

Table 2

Standardized direct effects, indirect effects, and total effects (with 95% CI based on the bias-corrected percentile method with 500 bootstrap samples) on task performance (Study 1)

	Age	Gender [a]	Materialism	Intrinsic life values	Task involvement
Direct effects					
Task involvement	-.12 (-.30, .08)	.08 (-.07, .18)	-.04 (-.22, .10)	.29** (.13, .43)	--
Task performance	-.05 (-.17, .08)	.00 (-.14, .12)	--	.23** (.10, .35)	.30** (.15, .43)
Indirect effects					
Task performance	-.04 (-.10, .01)	.02 (-.01, .07)	-.01 (-.08, .03)	.09** (.03, .15)	--
Total effects					
Task performance	-.09 (-.19, .01)	.02 (-.13, .15)	-.01 (-.08, .03)	.32* (.16, .42)	.30** (.15, .43)

Note. [a] males = 1; females = 2.

* $p \le .05$; ** $p \le .01$.

Table 3

Means (SD) and partial correlations between demographic variables and main variables, controlling for Exam I difficulty level and confidence level (Study 2)

	M (SD)	2	3	4	5	6	7
1. Age	18.81 (1.267)	-.09	.02	-.05	.10	-.05	-.09
2. Gender [a]	--		-.16*	.12	.08	.33***	.36***
3. Materialistic values	3.52 (.82)			-.73***	-.15*	-.01	-.15*
4. Intrinsic life values	5.01 (.54)				.31**	.05	.07
5. Task involvement	4.99 (.70)					-.08	.24***
6. Exam I grades	24.26 (6.43)						.79***
7. Exam II grades	23.91 (6.10)						

Note. [a] males = 1; females = 2.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 4

Standardized direct effects, indirect effects, and total effects (with 95% CI based on the bias-corrected percentile method with 500 bootstrap samples) on exam performance (Study 2)

	Age	Gender [a]	Perceived Difficulty	Confidence	Materialism	Intrinsic life values	Task involvement	Exam I grades
Direct effects								
Task involvement	--	--	--	--	-.06 (-.18, .06)	.27** (.13, .38)	--	--
Exam I grades	-.02 (-.11, .06)	.32** (.23, .41)	-.21* (-.36, -.08)	.10 (-.04, .25)	--	--	--	--
Exam II grades	-.02 (-.07, .04)	.05 (-.02, .12)	.01 (-.06, .08)	.01 (-.06, .08)	-.09* (-.16, -.02)	--	.27** (.21, .35)	.80** (.75, .85)
Indirect effects								
Exam II grades	-.02 (-.08, .05)	.25** (.18, .33)	-.17* (-.29, -.06)	.08 (-.03, .19)	-.02 (-.05, .02)	.07** (.04, .11)	--	--
Total effects								
Exam II grades	-.03 (-.12, .06)	.30** (.20, .39)	-.16 (-.28, -.04)	.09 (-.05, .23)	-.11* (-.18, -.03)	.07** (.04, .11)	.27** (.21, .35)	.80** (.75, .85)

Note. [a] males = 1; females = 2.   * $p \leq .05$; ** $p \leq .01$.

Conflict of interest

On behalf of all authors, the corresponding authors declares that they have no conflict of interest.

Ethical approval

All procedures performed in the studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (Ethics committee, Department of Psychology, University of Macau) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the studies.

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