

Are materialistic teenagers less motivated to learn?

Cross-sectional and longitudinal evidence from UK and Hong Kong

Lisbeth Ku*

Department of Psychology, University of Macau, Macao

Helga Dittmar

&

Robin Banerjee

School of Psychology, University of Sussex, UK

Corresponding author: Dr. Lisbeth Ku

E-mail: Lisbethku@gmail.com

Phone: 853-83978361

Fax: 853-28838312

Corresponding address: Department of Psychology, Faculty of Social Sciences and Humanities, University of Macau, Room PLG301, Pearl Jubilee Building, Taipa Macao.

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Abstract

Is materialism systematically related to teenagers' learning motivation as well as actual learning outcomes? The reported research tested a theoretical model of associations among materialism, achievement goals, and exam performance among teenagers. Study 1 tested the theoretical model in four groups of teenagers drawn from two different educational stages (Year 9 and Year 12) and two societies of different cultural heritage (UK and Hong Kong). Results supported the model that materialism was associated with lower intrinsic Mastery goals, and higher extrinsic Performance goals in all of the four groups. More importantly, one-year longitudinal data from Hong Kong (Study 2) showed that a materialistic value orientation at an earlier time point explained decreases in Mastery goals and increases in Performance goals a year later. Furthermore, earlier endorsement of materialistic values also predicted later deterioration of school performance. Theoretical and practical implications of the findings are discussed.

Keywords: materialism, achievement goals, learning motivation, school performance, teenagers

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Students in the having mode of existence will listen to a lecture, hearing the words and understanding their logical structure and their meaning and, as best they can, will write down every word in their looseleaf notebooks – so that, later, they can memorize their notes and thus pass an examination. But the content does not become part of their own individual system of thought, enriching and widening it. ... The student and the content of the lectures remain strangers to each other, except that each student has become the owner of a collection of statements made by somebody else.... (Fromm, 1976/1982, pp.17-18).

Archival data of over 9 million American university freshmen from 1966 to 1996 show that increasingly more students agree that the chief benefits of a university education are to ‘increase one’s earning power’ (increased from 54% in 1966 to 71% in 1996), and to ‘be able to make more money’ (increased from 50% in 1966 to 75% in 1996, Astin, 1998). This association between education and earning power also seems to be favored by many governments. For example, a UK government report on higher education (Walker & Zhu, 2003) focused exclusively on one benefit of education: how it is positively related to one’s earning power. A press release by the US Public Information Office on a report by the Census Bureau (Bergman, 2005) conveyed the same message. This purely instrumental, and somewhat materialistic, view of education has been widely communicated to young people via different channels such as schools and media. While governments, schools and parents may be hoping to encourage students to stay in school and continue their education through the ‘lure’ of money and

financial success, research evidence suggests that this effort may in fact be counterproductive. For example, Nicholls and colleagues argued for and found evidence to support the contention that teenagers who held the belief that education should increase one's earning and status were the least likely to commit to learning (Nicholls, Patashnick & Nolen, 1985). More recently, Goldberg and others found that youths who had a higher level of materialistic values orientation tended to report lower school performance (Goldberg, Gorn, Peracchio, & Bamossy, 2003).

The two studies both suggest that an extrinsic, materialistic orientation may be negatively related to both teenagers' learning motivation and learning outcome. These studies provide invaluable initial insights, but a number of important questions remain. Firstly, is materialism related to learning in a systematic way? Can this relationship be generalized to students at different educational stages? What is the psychological mechanism involved in the relationship between materialism and learning? Specifically, why do materialistic students tend to do less well in school, if they indeed do less well? Furthermore, what is the direction of the relationship between materialism and learning? While it is possible that more materialistic youths are less motivated in learning and hence potentially do less well in school, it is also not implausible that students who fail at school may use money and material possessions as compensations to overcome self-doubts that they perhaps experience in the academic context.

Fromm (1976/1982) suggested that an orientation towards materialistic values is detrimental to learning because materialistic students (or in Fromm's terminology, students in the 'having' mode) only 'hear' and 'memorize' words so that they can pass an exam. In the language of motivation theories, Fromm was essentially arguing that

materialistic students take an extrinsic orientation towards learning. Their focus is purely on passing exams and, presumably, getting good grades and qualifications. This, on the one hand, could suggest a prediction for better school performance contradictory to Goldberg et al's (2003) findings, but, on the other hand, also predicts a learning motivation that is entirely extrinsic, being instrumental in achieving greater earning and spending power. We believe two separate lines of research – one in materialism, and another in achievement goals – may shed some light on this seeming contradiction. By integrating insights from these two lines of research, we propose that teenagers' materialistic values are associated with lower intrinsic, mastery-oriented learning goals and with higher extrinsic, performance-oriented achievement goals. Such associations should be systematically related to school performance, which may in turn affect the orientation towards materialistic values.

Materialism

A prominent conceptualization of materialism is based on Self-determination theory (SDT, Ryan & Deci, 2000). Kasser and Ryan (1993, 1996) approach materialism by contrasting intrinsic life goals (such as self-acceptance or community feelings) with extrinsic goals (e.g., financial success). Their Aspiration Index assesses the relative importance of extrinsic goals, such as financial success, in comparison with intrinsic goals, such as affiliation (e.g., Kasser & Ryan, 1993). According to SDT, intrinsic goals satisfy our innate psychological needs for competence, autonomy, and relatedness and hence bring fulfillment and pleasure. Extrinsic goals, however, frustrate these innate needs as they are guided by external influences, such as rewards or approval from others, and therefore are less likely to bring happiness. In addition, “excessive concentration on

external rewards can distract people from intrinsic endeavors and interfere with personal integration and actualization” (Kasser & Ryan, 1993, p. 410).

Another major conceptualization of materialism is value orientation, a “set of centrally held beliefs about the importance of possessions in one’s life” (Fournier & Richins, 1991, p. 308). According to Richins and Dawson (1992), people who have highly materialistic values tend to exhibit three highly related sets of beliefs. First, they tend to believe that the acquisition and accumulation of material goods is a prime indicator of success and status. Second, high materialists place the acquisition of possessions at the center of their lives. In this sense, materialism is a life-style in which consumption plays a major role and serves as a life plan. Third, people with materialistic values tend to see material possessions as a means to happiness. Thus, possessions and consumption are central to materialists because they view these as essential to their well-being and satisfaction with life.

Research with older teenagers and adults suggests that materialism is negatively correlated with personal well-being (see meta-analysis by Dittmar, Bond, Hurst, & Kasser, 2011) and positively with psycho-social problems such as compulsive buying, over-spending tendency, and anti-social behavior (e.g., Watson, 2003; Dittmar, 2000; 2004; 2005a; 2005b; Roets, Van Heil & Cornelis, 2006; Duriez, Vansteenkiste, Soenens, & De Witte, 2007).

In addition, Srivastava, Locke, and Bartol (2001) argued that the different motives for wanting money may play a critical role in the correlates of materialism (Srivastava, Locke & Bartol, 2001). They found that the negative relationship between money importance and subjective well-being was due to the two ‘negative’ motives of social

comparison and overcoming self-doubt. Similarly, Banerjee and Dittmar (2008) found that children experiencing greater peer rejection reported higher level of social motives for materialism, which in turn predicted a higher endorsement of materialistic values orientation. These findings are in line with SDT's contention that when the basic psychological needs of autonomy, competence and relatedness are frustrated, people tend to seek compensation from extrinsic goals such as materialism (Kasser & Ryan, 1993; 1996; Ryan & Deci, 2000). Hence, negative social motives may be another important factor to consider in an investigation that seeks to test the relationship between materialism and learning as it is likely that teenagers who have poor peer relationships will endorse such negative social motives for materialism, which may in turn affect their learning.

The theoretical model that the present paper tested therefore included both social motives for materialism and the materialistic value orientation itself as predictors of teenagers' learning motivation. The conceptualization of social motives for materialism was based on Banerjee and Dittmar's (2008) work, where it is defined as 'the assumption that possession of material products is connected to peer reputation and status' (p.27). Materialism was defined as an important life goal (Kasser & Ryan, 1993), as well as a set of values (Richins & Dawson, 1992) . Based on these two concepts, two measures of materialism – the Relative Financial Goal Importance (RFGI; Kasser & Ryan, 1993, 1996) and the Youth Materialism Scale (YMS; Goldberg et al., 2003) were chosen for the present investigation. The RFGI defines and measures materialism as a personal life goal that centers on financial success and that contrasts with other intrinsic goals such as affiliation and self-acceptance. The YMS, on the other hand, taps the value system that

points to the importance of acquisition and consumption of material goods for personal life and happiness. Since all the participants in the present investigation were school pupils, the RFGI represents a future orientation because it taps the importance of goals later in life. This is conceptually different from the YMS, which focuses on the immediate gratification that the acquisition and consumption of material possessions may bring. Thus, the RFGI and YMS can also be seen as two facets of materialism that cover different time scales.

Achievement goals

Achievement goal theory is closely related to theories of intrinsic and extrinsic motivations, and emphasizes the types of goals individuals pursue in achievement situations, specifically goals that involve either the development or the demonstration of competence (Dweck & Elliott, 1983; Nicholls, 1984). Mastery goals represent a concern with understanding, improving and developing competence. Performance-approach goals involve a desire to demonstrate competence, often characterized by outperforming others and/or gaining external recognition. Performance-avoidance goals embody a worry about not appearing incompetent or less competent than others.

The associations of achievement goals and goal orientations with a variety of cognitive, affective, and behavioral outcomes have received a great amount of empirical attention. Impressive evidence has been accumulated to show that when oriented toward mastery goals, individuals tend to be more intrinsically motivated to learn, more likely to attribute success to effort and failure to lack of effort, have more positive affective reactions towards learning tasks, and have more positive feelings towards school and

school work than when oriented toward performance goals (see Pintrich & Schunk, 2002, for a review).

Performance-avoidance goals relate negatively to intrinsic motivation (e.g., Elliot & Harackiewicz, 1996) and positively to a number of maladaptive learning behaviors. Specifically, performance-avoidance goals or goal orientations have been linked with superficial processing and learning strategies (Elliot, McGregor & Gable, 1999), higher test anxiety (McGregor & Elliot, 2002), lower academic self-efficacy (Pajares, Britner, & Valiante, 2000) and lower performance (Elliot & Church, 1997).

As for performance-approach goals, the picture is not entirely clear. On the one hand, performance-approach goals have been found to be associated with the avoidance of novelty and challenge, the avoidance of help seeking, the use of cheating, and reluctance to cooperate with peers (see Midgley, Kaplan & Middleton, 2001, for a review). On the other hand, there is also evidence to suggest performance-approach goals are positively related to beneficial learning outcomes, including self-perception of academic efficacy and actual academic achievement (see Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002 for a review). Recently, Senko, Hulleman, and Harackiewicz (2011) proposed that there are two types of performance-approach goal. The first type focuses on outperforming others, and is often associated with higher achievement. The second type focuses on documenting ability, and is usually not related to better performance.

Cross-culturally, the validity of achievement goals and the trichotomous framework has been documented in Chinese societies, from which many of the participants in the present investigation were recruited. For example, Shin (2005) assessed the relations of

the three achievement goals with use of cognitive strategies and motivational processes among sixth-grade Taiwanese children. He found that the three goals predicted children's distinctive patterns of learning, in that mastery goal positively and performance-avoidance goal negatively predicted children's strategy use and intrinsic motivation. Likewise, Chan and Lai's (2007) large-scale study of secondary school students in Hong Kong found similar patterns of associations among the three achievement goals, learning strategies and achievement outcomes. In particular, mastery goal was significantly and positively related to deep strategy, while both performance-approach and performance-avoidance goals were significantly related to surface strategy. Although both mastery and performance-approach goals were positively related to academic achievement, performance-avoidance goals were negatively related to achievement.

Relationships between materialism and achievement goals

The proposal that materialism is systematically associated with achievement goals is supported by two initial lines of evidence. The first is a correlational study (Ku, 2004) that examined possible associations between materialistic values and achievement goals orientation among post-secondary school teenagers. Results showed that, in general, the belief in possession-defined success was related to performance goals, whereas the belief in the central role of material possessions in one's life and one's happiness was negatively related to academic self-efficacy.

The second set of evidence comes from a series of experimental studies on the relationships among personal goals, learning strategies and learning outcomes (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Vansteenkiste, Simons, Lens,

Soenens, & Matos, 2005). Vansteenkiste and his colleagues proposed that the three extrinsic goals in Kasser and Ryan's AI (1993, 1996) would lead to the adoption of maladaptive learning strategies and negative learning outcomes. To test this hypothesis, the researchers experimentally manipulated intrinsic and extrinsic personal goals among secondary school and university students (Vansteenkiste et al., 2004). Results showed that, when the learning was framed in terms of intrinsic goals (community, personal growth, health), participants were more likely to engage in deep processing, to be more persistent at the task, and also to perform better in assessments than when they were framed in terms of extrinsic goals (money, image).

In another study with a group of 11-12 year-olds learning healthy eating habits (Vansteenkiste et al., 2005), the researchers again found that intrinsic goal framing (health) affected conceptual learning, but the positive effect this time was fully mediated by task involvement. An important point to note here is that task involvement was measured by items based on Midgley et al.'s (1997) achievement goals, specifically, mastery goals. This suggests that the previously observed effects of intrinsic and extrinsic personal goals (personal growth, community feelings, money, and image) on learning behaviours and outcomes could potentially be explained by their impact on mastery goals.

A proposed model of associations between materialism and learning

As mentioned earlier, the aim of the paper was to systematically address the links between materialism and learning. Specifically, we intended to propose and test the validity of a theoretical model that stipulated that materialism (as measured by the YMS

and the RFGI) was linked to exam performance via achievement goals. Figure 1 lays out the specific links among the variables in the model.

[Figure 1 about here]

Based on Banerjee and Dittmar's (2008) finding, it was hypothesized that social motives for materialism positively predict materialism (i.e., both YMS and RFGI). Although no direct relationship between social motives for materialism and achievement goals was hypothesized, it is not wise to preclude the possibility that motives that focus on external approval can easily translate into a preference for achievement goals that center on external criteria of ability demonstration and comparison, namely, the performance goals.

Researchers in the SDT paradigm argue that extrinsic goals have a 'crowding-out' effect on intrinsic goals (e.g., Kasser & Ryan, 1993; Ryan & Deci, 2000). In the context of learning, it is plausible that the pursuit of extrinsic goals such as money may take away the time and energy that teenagers could spend on intrinsic learning, which is represented by mastery goals. Furthermore, literature on the effects of extrinsic rewards on intrinsic motivation (e.g., Deci, Koestner, & Ryan, 1999; Henderlong & Lepper, 2002) have shown that tangible rewards undermine intrinsic motivation and task interest. As more materialistic teenagers may internalize the money-making purpose of education to a greater degree, it is also more likely for them to have a stronger focus on external rewards such as good grades. These extrinsic rewards would then discourage teenagers' intrinsic engagement with learning. Based on these two considerations, it was hypothesized that materialism is negatively associated with mastery goals.

From previous research we know that high materialists tend to be more concerned with self-presentation, and engage in more social comparison (Schroeder & Dugal, 1995; Browne & Kaldenberg, 1997; Chan, 2007). Similarly, people who adopt performance goals are interested in using social comparison as normative ability assessments (Ames & Ames, 1981; Butler, 1987), and gain satisfaction from being superior to others in terms of performance (Butler, 1992). Hence, it seems social comparison is the psychological process that underlies both materialism and performance goals orientation. As it is indeed reasonable that a tendency to compare one's possessions with others' in the social context can easily translate into a focus on competing with others in the learning context, we hypothesized that materialism is positively correlated with both performance-approach and performance-avoidance goals.

Last of all, it was hypothesized that Performance-avoidance goals would be negatively related to exam performance. No specific hypothesis was formulated about the relationships of Mastery goal and Performance-approach goals with exam results, as findings from the achievement goals literature suggest the relationships may be different across different groups.

Age and country factors

At present we know very little about developmental differences in materialism, and practically nothing about how these differences may relate to achievement goals and learning outcomes. Using three groups of youths (10-, 14-, and 17-year-olds), Chaplin and John (2007) found that the 10-year-olds were the least and the 14-year-olds the most orientated towards materialistic values. In terms of achievement goal orientations, longitudinal studies suggest that from late childhood to late adolescence, there is a

decline of mastery goal and an increasing importance of performance goals (e.g., Anderman & Midgley, 1997; Gottfried, Fleming, & Gottfried, 2001; Middleton, Kaplan & Midgley, 2004). Given these age differences in both materialism and achievement goals orientations, it is possible that the levels of materialistic value endorsement and the likelihood of achievement goals adoption differ between age groups. Although the present research was capable of capturing such differences by including younger and older teenagers, it was expected that the general *relationships* between materialism and achievement goals as specified in Figure 1 are qualitatively similar across age groups.

Similarly, although the UK and Hong Kong groups that participated in this investigation may well differ from each other in levels of materialistic values orientation and achievement goals orientation, the general pattern of associations between materialism and achievement goals was expected to be similar. The rationale for this hypothesis is based on the fact that even though the UK and Hong Kong are two different societies in many respects, they also share a considerable amount of similarities.

The traditional culture of Hong Kong differs tremendously from that of the UK in terms of individualism and collectivism (Smith & Bond, 1998). However, the two societies share a very similar mass consumer culture that places a strong emphasis on expensive possessions and affluent lifestyles. Asia accounts for 40 percent of world luxury brand sales, and Hong Kong people buy more luxury items than any other Asians (China Daily, 2004). Desire for and obsessions with brands and luxurious consumer goods are similarly prevalent in the UK (BBC, 2007). Therefore, despite the different cultural heritage of the two societies, they share a cultural similarity in terms of values related to consumption and materialism.

The primary and secondary education enrollment ratio in Hong Kong is above 95%, but post-secondary education enrollment is only about 66%, while the tertiary education enrollment is even lower at about 32% (Education Commission, Hong Kong, 2004, 2006; Education, n.d.). This contrasts with the 75% post-secondary education enrollment rate, and the 60% tertiary education enrollment rate in the UK (Department for Education and Skills, UK, 2005; Education, n.d.). Despite these differences, teenagers' experience of education in the two societies may not be entirely dissimilar. In the UK, concerns have been raised about the national testing at four Key Stages – at age 7, 11, 14 and 16 years. The heavy assessments “define the school day, the curriculum, the teachers' responsibilities, the pupil's worth, the ideal parent, and what counts as ability” (Hall, Collins, Benjamin, Nind & Sheehy, 2004, p. 801). This testing-orientated approach is at the very heart of Hong Kong education. Strong competition and heavy exams drive schools, parents, and students to see attaining good exam results as their top priority. This is evidenced by, among other things, the flourishing private tutoring business, on which Hong Kong parents are estimated to spend half a billion Hong Kong dollars (i.e., about 64 million US dollars) each year (International Higher Education News, 2007).

Given the similarities as well as differences between the UK and Hong Kong, participants drawn from these two societies can offer a comprehensive context for examining the relevance of the theoretical model proposed here. It is important, however, to make explicit that it was *not* the purpose of the research to conduct a cross-cultural comparison between the UK and Hong Kong. In other words, the paper did not seek *cultural explanations* for any observed relationships between materialistic values and learning. Instead, it aimed to test for the validity of the theoretical model in two societies

of different heritage, yet similar consumer and educational backgrounds. The rationale for adopting such an approach is that, if enough evidence can be gathered in support of the model in two different societies, one can be more confident in its overall validity and relevance.

Study 1

Method

Participants. A total of 577 teenagers from four different schools participated in the study. There were 132 Year 9 pupils from the UK (mean age = 13.87 years, SD = .34 years, 75 girls) and 189 from Hong Kong (mean age = 13.96 years, SD = .70 years, 77 girls), 125 teenagers attending Year 12 in the UK (mean age = 16.94 years, SD = .50 years, 68 girls), and 131 in Hong Kong (mean age = 17.47 years, SD = .65 years, 73 girls).

Measures. Each participant completed a questionnaire pack that contained the following instruments: Social motives for materialism (Banerjee & Dittmar, 2008), Youth materialism scale (Goldberg et al., 2003), Aspiration index (Kasser & Ryan, 1993), Patterns of Adaptive Learning Scale that consists of the subscales Mastery, Performance-approach and Performance-avoidance (Anderman, Urdan & Roeser, 2003), and questions on the participants' SES background.

Social motives for materialism. All of the 4 items of the social motives for materialism scale in Banerjee and Dittmar (2008) were used in the present study. Respondents were asked to indicate, on a 6-point scale, how much they agreed or disagreed with statements such as 'I ask my parents to buy me certain things so that I

don't get left out by other children'. Higher scores indicate stronger endorsement of social motives for materialism. Cronbach's α ranged from .81 to .89 for the four groups.

Youth materialism scale (YMS). The YMS used in the present study was the original 10-item scale developed by Goldberg et al. (2003). Participants were asked to rate how much they agreed or disagreed with statements such as 'I'd rather spend time buying things, than doing almost anything else' on a 6-point scale, ranging from 1 = strongly disagree to 6 = strongly agree. Cronbach's α ranged from .78 to .84 for the four groups.

Aspiration index (AI). Participants were asked to rate, from 1 = not at all important to 5 = very important, the importance of four different goals for their life in the future. There were three intrinsic goals: personal growth (e.g. 'Knowing and accepting who you really are'), meaningful relationships (e.g. 'Sharing your life with someone you love'), and community contributions (e.g. 'Working to make the world a better place'), and one extrinsic goal: financial success (e.g. 'Having a job that pays well'). There were three items for each goal, hence resulting in a 12-item scale. Cronbach's α ranged from .75 to .84 for the intrinsic goals, and from .87 to .92 for the extrinsic financial goal for the four different groups. A composite score of Relative Financial Goal Importance (RFGI) was computed by subtracting the average score of all the goals items from the average score of the three financial goal items. This provides a mean-corrected, linearly transformed measure of relative centrality of the financial goals of each person. Negative scores represent an endorsement of intrinsic goals over the financial ones, zero scores represent those who endorse both types of goals equally, and positive scores reflect an emphasis on financial aspirations over other aspirations (Kasser & Ryan, 1996).

Patterns of adaptive learning scale (PALS). The PALS (Anderman et al., 2003) consists of three subscales: Mastery goal, Performance-approach goal and Performance-avoidance goal. There are five items on the Mastery scale (e.g. ‘One of my goals in class is to learn as much as I can’), five items on the Performance-approach scale (e.g. ‘One of my goals is to show others that I am good at my class work’), and four items on the Performance-avoidance scale (e.g. ‘One of my goals is to avoid looking like I have trouble doing the work’). Participants were asked to indicate on a scale ranging from 1 = strongly disagree to 6 = strongly agree how much they agreed with each statement. Reliabilities of all the achievement goals scales were good (Cronbach’s α from .72 to .90) except that Performance-avoidance only had an alpha of .41 among the 17-year-olds in Hong Kong. Further item analysis showed that the third item (‘It is important to me that my teacher doesn’t think that I know less than others in class’) had very low item-total correlation. Since this item had good item-total correlations in the other three groups, this item was removed from the scale only for the Hong Kong 17-year-old group. The new three-item Performance-avoidance had a Cronbach’s α of .74 in this group.

School exam results. School exam results of selected academic subjects were collected at the end of the school term. For the Year 9 teenagers, grades in English and Mathematics (in addition to the Chinese exam results for the Hong Kong pupils) were obtained. For the Year 12 students, since they all took different subjects in school, two subjects that most students enrolled in were picked. As a result, for the UK students, exam results in Psychology and Biology were collected; whereas in Hong Kong, results

of English and one more subject were collected.¹ All the exam results were converted into z-scores.

Demographic information. Due to the concern that the teenage participants may not have good knowledge about their family's financial situation such as the average monthly income, the participants were asked about the types of housing they lived in (1 = low-rental houses provided by government to low-income families; 2 = private rental; 3 = own property). A comparison between participants from low-SES families who lived in low-rental government public housing estates (148 teenagers, or 28.7%) and participants who lived in other types of accommodation was conducted to test for the potential effects of SES on materialism. A Multivariate Analysis of Covariance (MANCOVA) that controlled for country and age groups was carried out on Social motives for materialism, RFGI and YMS, and found no significant effect, $F(3, 512) = 1.56, n.s.$ SES background hence was not controlled for in the present data set.

The effects of gender on Social motives for materialism, RFGI, YMS, and the three achievement goals were also checked in two separate sets of MANCOVA that controlled for country and age groups. No significant gender effect was found, $F(3, 121) = 1.16, n.s.$, and $F(3, 120) = .03, n.s.$ Gender was therefore not controlled for in all the subsequent analyses.

Procedure. The questionnaire pack for Hong Kong participants was translated into Chinese following standard back-translation procedures (Brislin, 1970). Consent for participating in the study was obtained from the head teachers of the respective schools in *loco parentis* as well as from the teenagers themselves. The participants were also

¹ Results of English and History exams were used for the Year 12 students who came from the 'arts class'; English and Geography for the 'social science class'; and English and Physics for the 'science class'.

informed of their right to confidentiality, anonymity, and the right to withdraw from the study at anytime.

The questionnaire was administered in a whole-class setting by class teachers. There were two counter-balanced versions of the questionnaire (alternating the order of materialism scales with that of achievement goals scales) and at each administration equal portions of each version were handed out. This was done because asking respondents questions about materialistic values might lead to a heightened awareness of such values, and this could in turn affect the way they responded to the achievement goals questions. A MANOVA on the three materialism scales that controlled for country and age groups found a significant main effect of order, $F(3, 571) = 5.04, p < .01, \eta^2 = .03$, but only one scale showed a significant difference at the univariate level: Social motives for materialism, $F(1, 573) = 7.45, p < .01, \eta^2 = .01$, with the participants who completed the achievement goals scales first scoring slightly higher on Social motives for materialism ($M = 2.94, SD = 1.02$) than those who completed the materialism scales first ($M = 2.72, SD = .93$). However, this difference was very small, with the effect size only at .01. Given that the MANOVA on the three achievement goals found no significant effect, $F(3, 570) = .99, ns.$, it was safe to conclude that the order of the questions did not pose a serious confounding factor for the results of the study.

Results and brief discussion

Zero-order correlations between Social motives for materialism, RFGI, YMS, achievement goals, and exam performance (Table 1) provided initial support for the theoretical model outlined in Figure 1. The intercorrelations showed that materialism (as measured by RFGI and YMS) was in general negatively correlated with Mastery goal,

and positively associated with Performance-approach and Performance-avoidance goals. Specifically, it seemed that the negative relationship between RFGI and Mastery goal was particularly strong, whereas both Social motives for materialism and YMS were more strongly related to the Performance-approach and Performance-avoidance goals in a positive direction.

Next, based on the patterns observed in the zero-order correlations, and in line with our a priori model, a model that tested for relationships between materialism and learning was conducted. The model posited Social motives for materialism as the predictor of the two materialism scales RFGI and YMS, and of the two performance goals Approach and Avoidance. RFGI was modeled to predict Mastery goal, and YMS the two performance goals. All three goals Mastery, Performance-approach and Performance-avoidance were modeled to predict exam performance.

This model of associations among materialism, achievement goals and exam outcomes (Figure 2) had good fit indices, $\chi^2(28) = 27.30, n.s., CFI = 1.00, GFI = .99, SRMR = .03, RMSEA = .00 (.00, .03)$. The model was able to explain up to 17% of variance in the three achievement goals, and up to 44% of variance in exam performance among the four different groups. Social motives for materialism directly predicted both the two materialism scales, and the two performance goals. RFGI was a negative predictor of Mastery goal, which was the only variable that predicted exam performance across all four groups. YMS significantly predicted Performance-avoidance goal among the British 14-year-olds but neither YMS nor RFGI was related to Performance-approach goal. Performance-avoidance goal significantly and negatively predicted exam performance among the UK 14-year-olds, but not in the other three groups. The good

model fit indices showed that the model fit the four-group data well, hence supporting the contention that the relationship between learning as hypothesized by the theoretical model generalizes to both cultural and age groups.

[Figure 2 about here]

To summarize briefly, Study 1 showed initial support for the theoretical model outlined in Figure 1. It was found that materialism, in its various facets, was negatively associated with Mastery goal and positively with Performance-approach and Performance-avoidance goals in both the UK and Hong Kong, among both the 14- and 17-year-olds. Both Mastery and Performance-avoidance goals were, in turn, associated with school results. Since the cross-sectional nature of Study 1 does not allow for an inference of causality, a longitudinal follow-up was conducted in Hong Kong one year after the collection of data for Study 1 to address the issue of temporal antecedence.

Study 2

Method

Participants. Out of the original 320 Hong Kong participants in Study 1, a total of 228 were successfully contacted one year after and participated in the longitudinal follow-up. Of this sample, 122 teenagers were from Year 10 (mean age = 14.81 years, SD = .89 years, 50 girls), and 106 were from Year 13 (mean age = 17.54 years, SD = .91 years, 76 girls). As larger attrition of respondents occurred among the 14-year-olds, two separate MANOVAs were conducted to compare teenagers who remained in the second phase with those who did not, with respect to their first phase responses on materialism and on achievement goals. Results indicated no significant differences between the two

groups in terms of Social motives for materialism, RFGI and YMS, $F(1, 188) = 1.34$, n.s., nor on the three achievement goals, $F(1, 188) = .29$, n.s..

Measures. Similar to Study 1, each participant completed a questionnaire pack that contained: Social motives for materialism (Banerjee & Dittmar, 2008), YMS (Goldberg et al., 2003), Aspiration Index (Kasser & Ryan, 1993), and Patterns of Adaptive Learning subscales of Mastery, Performance Approach and Performance Avoidance goals (Anderman et al., 2003). As in the previous study, Performance Avoidance Goal consisted of only three items for the 17-year-old group. All scale reliability coefficients were good, with α ranging from .78 to .96.

Procedure. The questionnaire was administered to the participants in the same way as described in Study 1. They were reminded of the study that they participated in a year ago and were told that this was the second part of the same study. They were assured again of their right to confidentiality and anonymity, and the right to withdraw from the study at any time. Similar to Study 1, exam results were collected from the class teachers at the end of the school term.

Approach to analyses of the longitudinal data

To examine the temporal relationships among Social motives for materialism, materialism, achievement goals and exam results, two sets of autoregressive models with lagged effects were planned. Set one first looked at Social motives for materialism and the three achievement goals, and then at RFGI and YMS with the three achievement goals. Set two tested for direct relationships Social motives for materialism might have with exam performance, and then examined the relationships RFGI and YMS might have with exam performance.

Every set of relationships tested in the following sections started with a fully saturated, autoregressive model with cross-lagged effects. Based on this initial saturated model, a new model with hypothesized paths between Time 1 and Time 2 variables was then tested with its fit indices reported. Parameter constraints analyses were also carried out to test for significant age group variations and chi-square change indices were calculated.

An autoregressive model involves a linear regression of the current value of a given variable on temporally prior values of the same variable. When autoregressive effects are put together with cross-lagged effects, we can evaluate the lagged effect of X_t on Y_t while controlling for the autoregressive effect of Y_{t-1} on Y_t . In this way, for example, we can estimate the effect of materialism at Time 1 on achievement goals at Time 2 while controlling for the effect of achievement goals at Time 1 on achievement goals at Time 2 (Twisk, 2003). Thus, with this analytic approach, we can evaluate temporal sequences in the reciprocal relationships between materialism and achievement goals, and between materialism and exam performance.

Results and brief discussion

Social Motives for materialism, Materialism, and Mastery goal. The autoregressive model that tested the cross-lagged effects of Social motives for materialism on Mastery goal found no significant lagged effects. On the other hand, the model that tested for lagged effects of materialism on Mastery goal, and vice versa, showed that for the older teenagers, adopting a life goal that emphasizes financial success more than other aspects of life (RFGI) may result in lower intrinsic engagement with learning (Mastery). The model fitted the data well, $\chi^2(16) = 19.21, n.s., CFI = 1.00, GFI$

= .97, SRMR = .07 and RMSEA = .03 (Figure 3). Equality constraint analysis showed that the path from RFGI Time 1 to Mastery Goals Time 2 was not significantly different across the two age groups, $\Delta\chi^2(1) = 1.31, n.s.$, although the effect did not attain significance within the younger group.

[Figure 3 about here]

Social motives for materialism, materialism and performance goals. Temporal relationships between Social motives for materialism and the two performance goals were first tested in a fully saturated cross-lagged model that controlled for the effects of Time 1 Social motives for materialism and performance goals on their Time 2 outcomes. After dropping the non-significant parameters one by one, a new model was formed that depicted a lagged effect of Social motives for materialism on Performance-approach goal (see Figure 4). Model fit was excellent, $\chi^2(10) = 12.33, ns$, CFI = 1.00, GFI = .98, SRMR = .07 and RMSEA = .03. Parameter constraint analysis showed that the path from Social motives for materialism Time 1 to Performance-approach goal Time 2 was not significantly different across age groups, $\Delta\chi^2(1) = 1.028, n.s.$, although the relationship again attained significance only in the older group.

[Figure 4 about here]

As the sample size in the two groups is not sufficient for a model that incorporates both the two measurements of materialism and the two performance goals, two separate saturated models were tested. One (Figure 5) tested the cross-lagged effects of materialism on Performance-approach goal and vice versa, and another (Figure 6) tested the effects on Performance-avoidance goals and vice versa. Model fit indices of both models are very good: $\chi^2(10) = 6.05, n.s.$, CFI = 1.00, GFI = .99, SRMR = .03 and

RMSEA = .01; $\chi^2(8) = 15.59, p = .05$, CFI = .99, GFI = .98, SRMR = .09 and RMSEA = .07.

[Figures 5 & 6 about here]

For the 17-year-olds, no lagged effects of materialism on performance goals were found. Instead, Time 2 YMS was positively predicted by both Performance-approach and Performance-avoidance goals, while Time 2 RFGI was positively predicted by Time 1 Performance-approach goal. For the 14-year-olds, on the other hand, Time 1 RFGI positively predicted Performance-avoidance goal, suggesting that teenagers who held initial belief in the relative importance of financial success tended to subsequently adopt Performance-avoidance goal in their learning. However, only among the 17-year-olds were Performance-avoidance and Performance-approach goals positively associated with subsequent materialism. Constraint analyses confirmed that there was significant group difference in the relationships between Performance-approach goal Time 1 and YMS Time 2, $\Delta \chi^2(1) = 18.16, p < .001$, and between Performance-avoidance goal Time 1 and YMS Time 2, $\Delta \chi^2(1) = 31.53, p < .001$.

Materialism and exam performance. As for the relationship between materialism and exam performance, the autoregressive model with cross lagged effects showed that the only relationship that was strong enough to reach significance was between YMS Time 1 and exam performance Time 2 among the 14-year-olds (Figure 7), $\beta = -.10, p < .05$. In other words, 14-year-olds who held a materialistic value orientation a year before tend to do less well in school exams one year later. The lagged model has very good fit indices, $\chi^2(10) = 8.40, ns$, CFI = 1.00, GFI = .99, SRMR = .04 and RMSEA = .00. Equality constraint analysis indicated that the path from the YMS Time 1 to exam

results Time 2 was not significantly different across the two groups of teenagers, $\chi(2) = 3.07, n.s.$

[Figure 7 about here]

Discussion

We proposed and tested a theoretical model of associations between materialism and learning in four groups of teenagers from two different societies and at different educational stages. We adopted two conceptualizations of materialism in our investigation, and as a result two scales – Goldberg et al.'s (2003) Youth Materialism Scale (YMS), and Relative Financial Goal Importance (RFGI), based on Kasser and Ryan's (1993) Aspiration Index – were employed as measurements of materialism. We also took in Srivastava et al.'s (2001) argument that negative motives for materialism may have effects that are over and above the effects of materialism. In this regard, we used Banerjee and Dittmar's (2008) Social motives for materialism scale to tap the belief that material possessions can bring 'social benefits' such as peer acceptance and peer popularity.

Findings generally supported the theoretical model, suggesting that more materialistic teenagers tended to be less likely to adopt Mastery goal and more likely to adopt Performance-approach and Performance-avoidance goals in their learning. Moreover, concurrent and longitudinal analysis revealed that these patterns were linked with school results.

Materialism and Mastery goal

No previous empirical study has directly investigated the relationships that materialism has with learning motivation and goals, although based on SDT (Ryan &

Deci, 2000), the paper predicted that teenagers who gave excessive attention to extrinsic life goals such as financial success would not be concerned with intrinsic motivation and goals such as developing mastery in the learning context. Indeed, results from the cross-country comparison (Study 1) and the longitudinal follow-up (Study 2) showed that materialism was indeed negatively related to intrinsic mastery-oriented learning motivation, and positively to externally-focused performance goals. Specifically, RFGI seems to be of particular importance as it was not only negatively related to Mastery goal in the same time frame among all four groups of teenagers, but it was also associated with decreases in Mastery goals *and* increases in Performance-avoidance goals among the Hong Kong teenagers over a period of one year. In other words, teenagers who valued financial success over other intrinsic life goals such as relatedness not only tended to be less mastery-oriented in their learning in the first place, but their intrinsic mastery-oriented motivation also tended to decrease over time. Furthermore, they also tended to become increasingly focused on avoiding demonstrating incompetence.

As the quotation at the beginning of the paper illustrated, Fromm (1976/1982) suggested that students in the ‘having’ mode of existence are not concerned with learning *per se*. Instead, they are only concerned with ‘collecting’ and memorizing statements for the purposes of passing exams. Similarly, SDT proposed that excessive concentration on external rewards can distract people from intrinsic endeavors (Deci & Ryan, 1985, in Kasser & Ryan, 1993). The present finding that materialism was negatively related to Mastery goal orientation provides empirical support to Fromm’s contention that materialistic pupils are indeed less intrinsically motivated in their learning. It also extends the application of SDT to the academic achievement context, and supports the

notion that excessive focus on external rewards may not be conducive for intrinsic mastery-oriented learning.

Materialism and Performance goals

The theoretical model did not originally hypothesize direct relationships among Social motives for materialism and achievement goals, although it acknowledged that a motive which focuses on external approval can easily translate into a preference for performance goals, which center on external criteria of ability comparison. Findings from the two studies in general supported this reasoning. Social motives for materialism were associated with both Performance-approach and Performance-avoidance goals in the same time frame among all four groups of teenagers. Moreover, the longitudinal data showed that Social motives for materialism predicted increases in the 17-year-olds' Performance-approach goal orientation over a one year period. These findings suggest that Social motives for materialism may have independent effects on learning, over and above the effects of materialism.

A somewhat unexpected line of findings is the lagged effects of Performance goals on materialism among the 17-year-olds. While YMS was in general positively associated with Performance-approach and Performance-avoidance goals in Study 1, YMS did not significantly predict changes in the two goals over time. Instead, Performance-approach goal positively predicted increases in both YMS and RFGI, and Performance-avoidance goal predicted increases in YMS. In other words, teenagers who were originally performance-focused in their learning went on to develop more materialistic values and life goals over a period of one year.

The relationships that Social motives for materialism and materialism have with the two Performance goals suggest materialism and performance goals may reinforce each other through a common underlying self-value system that is externally-oriented and that highlights a sense of contingent self-esteem (Ryan & Browne, 2003). According to SDT (Deci & Ryan, 1995), contingent self-esteem is experienced by people who see their worth as dependent upon accomplishing certain goals, or appearing in certain ways. Kasser et al. (2007) further argued that the prevalent economic system in contemporary 'westernized' societies is a system that encourages contingent self-esteem in that wealth equals self-worth. This sense of contingent self-esteem in materialism is very similar to the 'ego-involvement' process in achievement context. As Nicholls (1984, 1989) argued, individuals who are oriented towards performance goals often see their performance in a task as representative of some central, self-relevant attribute that is essential to their sense of self-esteem. This is why performance goals are also commonly known as 'ego goals' and the psychological process involved in the orientation of such goals as 'ego involvement'. As both materialism and performance goals represent increased focus on normative comparison and tangible signs of success and status, it is very likely that they may both stem from this external contingent sense of self-worth. Therefore, it makes sense that an orientation towards one would lead to the intensification of the other.

Materialism and exam performance

Goldberg et al's (2003) study showed that more materialistic children aged between 9 and 14 in the US tended to like school less and reported somewhat lower school performance. Similarly, Ku (2004) found that materialistic teenagers in post-secondary education in UK and Hong Kong had lower evaluation of their own academic ability.

Our findings gave some initial support that materialistic teenagers might perform less well in school. Within the same time frame, RFGI was directly and negatively associated with exam performance among the older Hong Kong teenagers, whereas YMS was related to lower performance among the younger UK participants. What is probably more important, YMS also predicted negative *changes* in school performance among the 14-year-olds in Hong Kong.

The potential negative relationship that materialism has with exam performance points to the need to evaluate the impacts of socially oriented values on students' academic achievement. In addition to individual, family and school factors that contribute to teenagers' academic performance, factors that are deeply grounded in the contemporary consumer society – such as overt preoccupation with consumption, and the belief that wealth and financial success are among the most important goals worthy of pursuit – are crucial considerations for a research paradigm that examines factors that facilitate students' intrinsic learning and enhance learning outcomes.

Practical implications

The findings of the present investigation have important practical implications. Firstly, the negative associations between materialism and learning in general, and the detrimental effects RFGI has on intrinsic mastery-oriented learning and performance-avoidance in particular point to the fact that the stress society places on financial success as the 'ultimate reward' of learning is, in fact, counterproductive. As described at the beginning of this article, governments put special effort into highlighting the monetary benefits that education can bring. This instrumental view of education is also commonly communicated to youths through different institutions such as the media, schools and

family. Worryingly and ironically, however, this focus on future financial success over other intrinsic goals is in fact directly and negatively related to mastery-oriented learning. Hence, these findings suggest governments' and parents' attempts to raise the educational aspiration of their children by linking education to increased earning power may not have its desired effect at all. In fact, according to theories of SDT and overjustification effects (e.g., Smith & Pittman, 1978; Tang & Hall, 1995; Deci, Koestner, & Ryan, 1999), such a focus could very well discourage youths from fully engaging with learning.

Secondly, the general societal emphasis on luxurious lifestyle and conspicuous consumption is taking its toll on youths' learning. Materialistic values were not only negatively associated with teenagers' mastery-oriented learning motivation, but also resulted in a deterioration of school grades over time. As materialistic values characterized by heightened desire for acquiring and consuming consumer goods seem to peak at mid-adolescence at about 13-15 years (Chaplin & John, 2007), it is important to focus intervention efforts from schools and parents on this group of teenagers.

Limitations

Although both the cross-sectional and longitudinal findings in the present investigation provided evidence for the theoretical model that the paper proposed, the correlational nature of the studies prohibits conclusions on the causal relationships between many of the observed variables. The longitudinal part of the investigation provided improved evidence over beyond the cross-sectional data in order to support the contention that materialism affects achievement goals and exam performance. However, temporal precedence of materialism over later changes in achievement goals and exam results still cannot entirely rule out the possibility that the changes were caused by some

other factors not considered in the study. Furthermore, the reliance on self-reported measures of materialism and achievement goals inevitably limits the conclusions that can be drawn from the relationships uncovered. Thus, experimental studies that are designed to directly test the causal effects of materialism on behavioural indicators of achievement goals are needed to build on the key findings from the present investigation.

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Figure 1. Materialism and learning: A theoretical model of associations.

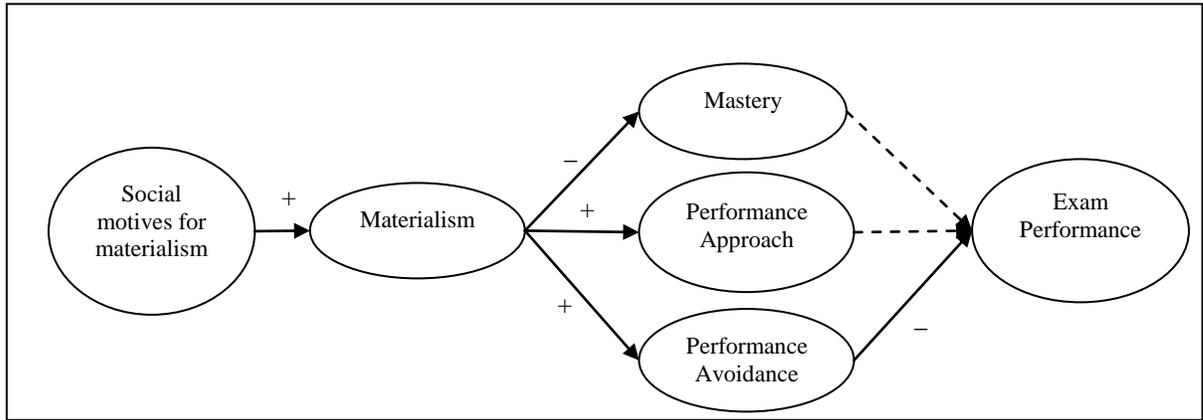
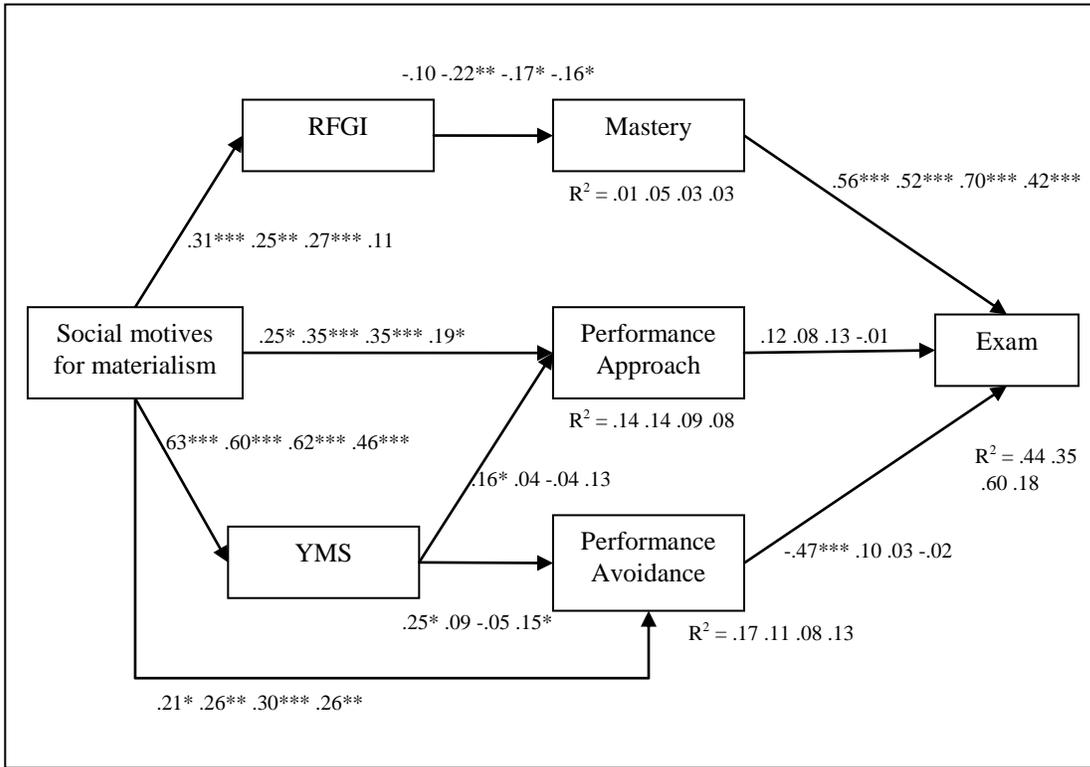


Figure 2. A path analysis diagram showing the relationships among materialism, achievement goals and exam performance



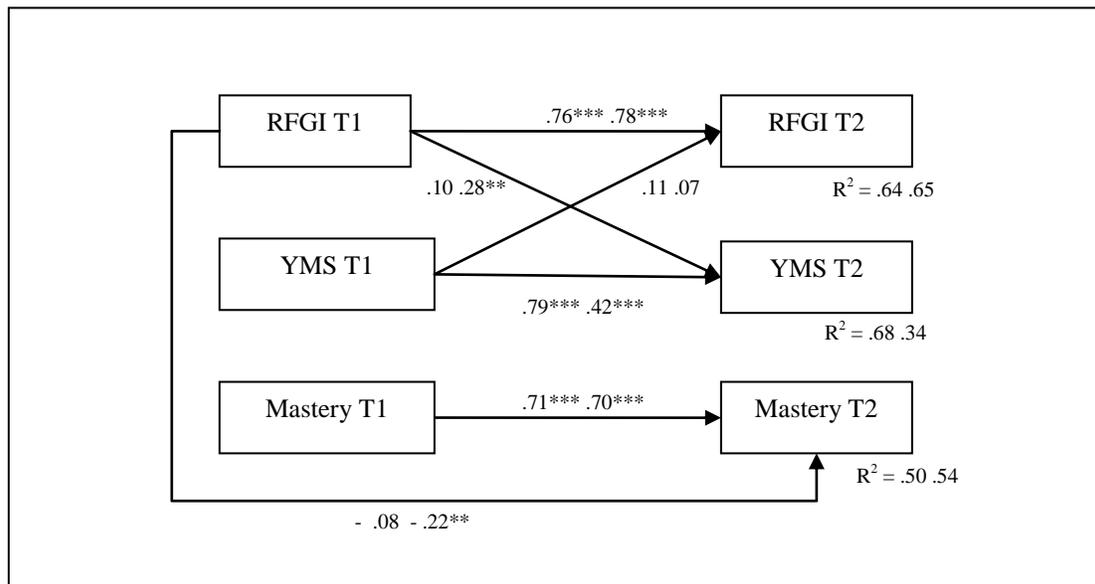
UK 14-year-olds; UK 17-year-olds; Hong Kong 14-year-olds; Hong Kong 17-year-olds

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

Notes.

1. The error terms of RFGI and YMS were significantly correlated among the UK 14-year-olds, Hong Kong 14-year-olds, and Hong Kong 17-year-olds, $r_s = .30, .24,$ and $.34, p_s < .01$.
2. The three goals were allowed to covary. Significant correlations were found between Mastery and Approach among the UK 14-year-olds, UK 17-year-olds, and Hong Kong 14-year-olds, $r_s = .25, .30,$ and $.41, p_s < .01$. For Mastery and Avoidance, significant correlations were found among the UK 17-year-olds, Hong Kong 14-year-olds, and Hong Kong 17-year-olds, $r_s = .35, .43,$ and $.20, p_s < .05$. For Approach and Avoidance, significant correlations were found among all four groups, $r_s = .59, .71, .69,$ and $.71, p_s < .001$.

Figure 3. A two-group autoregressive and cross-lagged model of the RFGI, the YMS, and Mastery goal



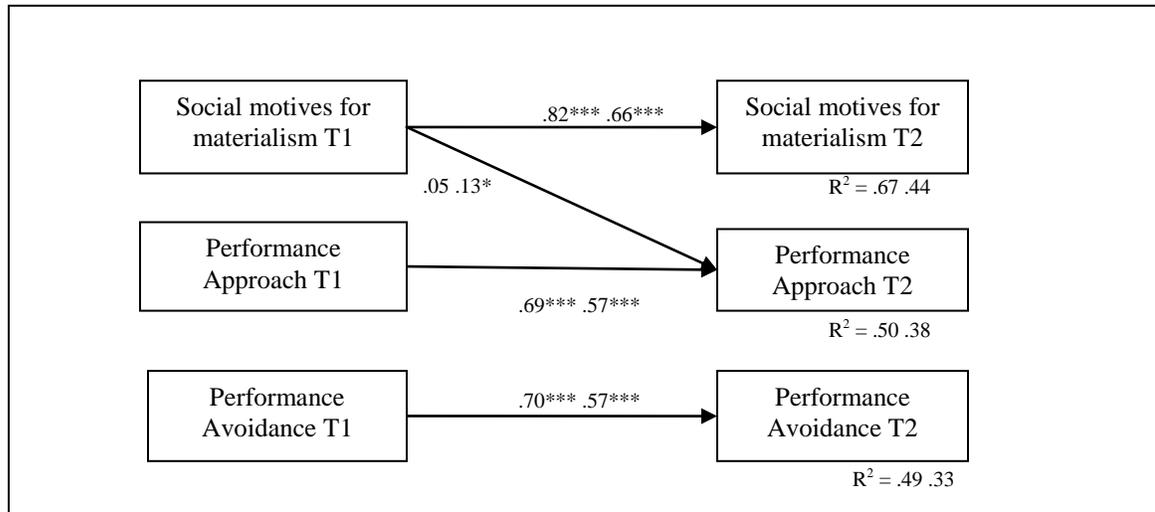
14-year-olds; 17-year-olds

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

Notes.

1. The error terms of RFGI T1 and YMS T1 were significantly correlated in both groups, $r_s = .33, .36$, $p_s < .01$. Among the 17-year-olds, the error terms of RFGI T2 were significantly correlated with those of YMS T2, $r = .26$.

Figure 4. A two-group autoregressive and cross-lagged model of Social motives and Performance goals.



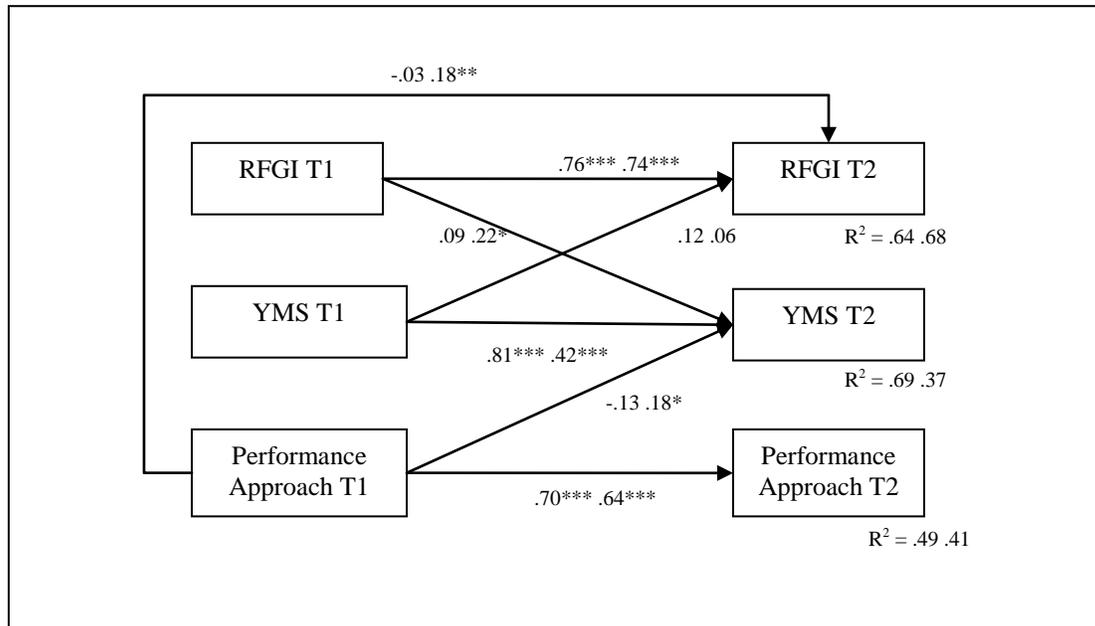
14-year-olds; 17-year-olds

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

Notes.

1. The error terms of Social motives T1, Performance-approach T1 and Performance-avoidance T1 were all positively correlated in both groups: $r_s = .31, .22, p_s < .05$ for Social motives T1 and Performance-approach T1; $r_s = .25, .32, p_s < .01$ for Social motives T1 and Performance-avoidance T1; and $r_s = .79, .73, p_s < .001$ for Performance-approach T1 and Performance-avoidance T1.
2. The error terms of Social motives T2, Performance-approach T2 and Performance-avoidance T2 were also positively correlated in both groups: $r_s = .18, .47, p_s < .05$ for Social motives T2 and Performance-approach T2; $r_s = .33, .49, p_s < .01$ for Social motives T2 and Performance-avoidance T2; and $r_s = .56, .74, p_s < .001$ for Performance-approach T2 and Performance-avoidance T2.

Figure 5. A two-group autoregressive and cross-lagged model of the RFGI, the YMS, and Performance-approach goals.



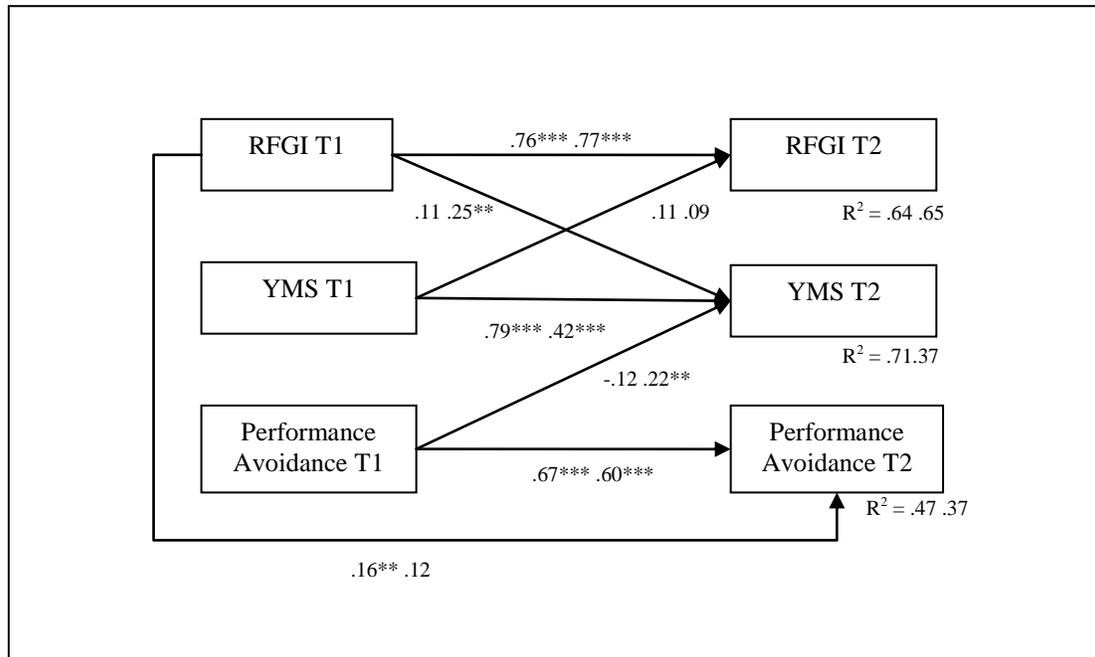
14-year-olds; 17-year-olds

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

Notes.

1. The error terms of RFGI T1 and YMS T1 were significantly correlated in both groups, $r_s = .33, .36$, $p < .01$. Among the 14-year-olds, the error terms of YMS T1 were significantly correlated with those of Performance-approach T1, $r = .18$, $p < .05$. The error terms of RFGI T1 were significantly correlated with those of Performance-approach T1 among the 17-year-olds, $r = .19$, $p < .05$.
2. The error terms of RFGI T2 were significantly correlated with YMS T2 among the 17-year-olds, $r = .21$, $p < .05$. YMS T2 and Performance Approach T2 were significantly correlated among the 14-year-olds, $r = .33$, $p < .01$.

Figure 6. A two-group autoregressive and cross-lagged model of the RFGI, the YMS, and Performance-avoidance goals.



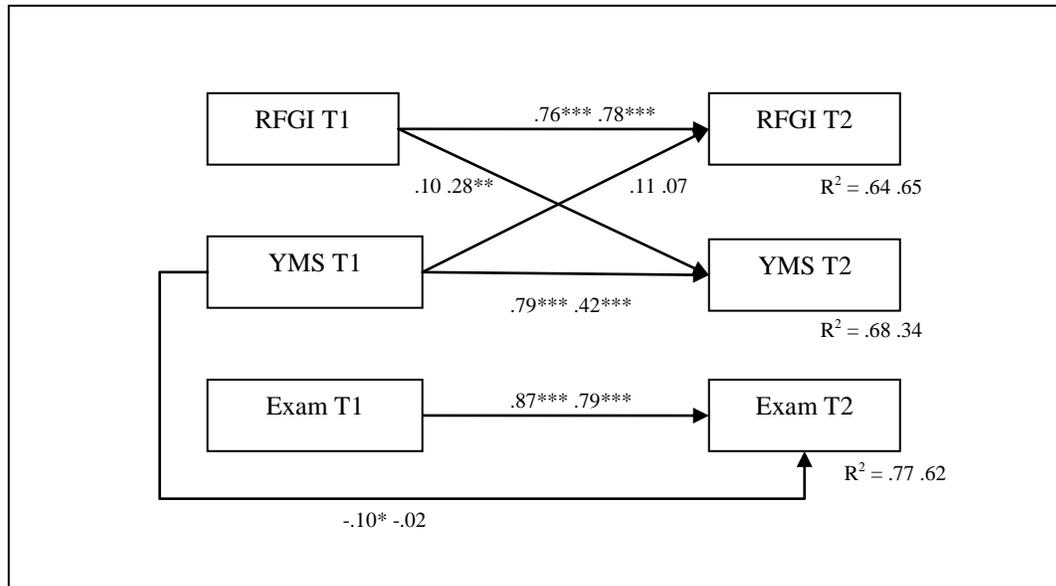
14-year-olds; 17-year-olds

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

Notes.

1. The error terms of RFGI T1 and YMS T1 were significantly correlated in both groups, $r_s = .33, .38$, $p_s < .01$.
2. The error terms of RFGI T2 were significantly correlated with YMS T2 among the 17-year-olds, $r = .26$, $p < .01$. Both RFGI T2 and YMS T2 were significantly correlated with Performance Avoidance among the 17-year-olds, $r_s = .21, .27$, $p < .05$. For the 14-year-olds, only YMS T2 were correlated with Performance Avoid T2, $r = .43$, $p < .001$.

Figure 7. A two-group autoregressive and cross-lagged model of the RFGI, the YMS, and exam performance.



14-year-olds; 17-year-olds

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

Notes.

1. The error terms of RFGI T1 and YMS T1 were significantly correlated in both groups, $r_s = .33, .36$, $p_s < .01$. For RFGI T1 and Exam T1, the error terms were negatively correlated among the 17-year-olds, $r = -.19$, $p < .05$, but not among the 14-year-olds, $r = -.04$, ns .
2. Among the 17-year-olds, the error terms of RFGI T2 were significantly correlated with those of YMS T2, $r = .26$. The error terms of YMS T2 were negatively correlated with those of Exam T2, $r = -.25$, $p < .05$. These correlations were not significant among the 14-year-olds.

Table 1

Zero-order correlations between Social Motives, RFGI, YMS, achievement goals, and exam results

	Group	1	2	3	4	5	6	7
1. Social Motives	UK 14		.31***	.63***	.10	.38***	.38***	-.16
	UK 17		.26**	.60***	.02	.38***	.33***	.12
	HK 14		.27***	.62***	.02	.33***	.30***	.04
	HK 17		.11	.46***	-.18*	.23**	.30**	-.10
2. RFGI	UK 14			.42***	-.08	.24**	.27**	-.17*
	UK 17			.25**	-.23**	.09	.03	-.07
	HK 14			.35***	-.14	.13	.10	-.08
	HK 17			.34***	-.17*	.17*	.07	-.18*
3. YMS	UK 14				-.04	.32***	.38***	-.24**
	UK 17				.06	.28**	.28**	.04
	HK 14				-.00	.18*	.16*	.01
	HK 17				-.01	.22**	.28***	-.07
4. Mastery	UK 14					.24**	.14	.52***
	UK 17					.27**	.34***	.57***
	HK 14					.38***	.41***	.76***
	HK 17					.06	.14	.42***
5. Approach	UK 14						.65***	-.05
	UK 17						.74***	.28**
	HK 14						.72***	.42***

	HK 17	.74***	.00
6. Avoidance	UK 14		-.32***
	UK 17		.33***
	HK 14		.41***
	HK 17		.03

7. Exam

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