

Support matters: Predictors of intrinsic motivation in older learners in Taiwan

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Previous research has made it clear that older learners are mainly learning for learning's sake. However, few studies have explored the intrinsic aspects of older learners' motivation in detail; also, the factors that influence their learning motivation remain under-researched and under-theorised. To address this gap, this survey-based quantitative study investigated the learning motivations of 816 older learners from an intrinsic-motivation viewpoint, and explored the predictors of these motivations, including institutional as well as personal factors. The results indicated that these older learners rated their intrinsic motivations highly (3.97/5 overall), and that such motivations could be differentiated into cognitive-oriented and social-oriented motivations. The most important predictors of intrinsic motivations for the respondents were institutional variables, especially teacher support and peer support. Importantly, institutional predictor variables were found to diminish the negative impacts of both self-reported poor health and age on these older adults' overall intrinsic motivation to learn. These findings imply that, in Taiwan, providing more teacher- and peer support is likely to increase the intrinsic motivation to learn for vulnerable older adults who are disadvantaged by health problems and old age.

Keywords: *Older learners, intrinsic motivation, motivation to learn*

Life expectancy and the number of older adults are increasing dramatically across the globe, leading to widespread scholarly and policy support for lifelong learning as a way to increase these citizens' health and well-being (Sloane-Seale & Kops, 2007). An important case in point is Taiwan, whose population aged 65 and older is expected to increase at a faster rate than in any other country, foreshadowing demographic trajectories that will eventually occur elsewhere as well and prompting extensive Taiwanese government support for older adult learning (Council for Economic Planning and Development, 2011). A considerable body of research on the reasons older adults participate in learning activities has produced a consensus that their primary motivation is intrinsic (Bye, Pushkar, & Conway, 2007; Bynum & Seaman, 1993; Fujita-Starck, 1996; Kim & Merriam, 2004; Scala, 1996): that is, that they engage in these activities for their own sake rather than for any type of external reward. This type of motivation is reliably related to psychological health (Deci & Ryan, 2008). However, few studies have explored the intrinsic aspects of older learners' motivation in detail (e.g. Stephan, Fouquereau, & Fernandez, 2008; Szücs, 2001). Moreover, recent studies have identified low motivation to learn among older adults who are in poor physical health, live in rural areas (Caro, Caspi, Burr, & Mutchler, 2009; Mott, 2008; Sloane-Seale & Kops, 2007), and/or are in extreme old age. To shed additional light on these issues, the present survey-based quantitative study explored the motivations of a sample of older Taiwanese learners, focussing on intrinsic motivation (IM) to investigate its predictors.

Motivation to learn

The most widely accepted theoretical framework for explaining adult and older learners' motivation is the typology devised by Houle (1961), which much subsequent research has tested and refined. In Houle's original landmark study, he interviewed 22 adults (12 men and 10 women) to understand the reasons they participated in continuing education activities, and identified three types of adult learners based on their motivations: goal-oriented, activity-oriented, and learning-oriented. Those who were goal-oriented had clear objectives, usually

related to social advancements such as job promotion. Activity-oriented adult learners participated in learning activities primarily for social reasons, with any given class's stated purpose being of secondary importance. Lastly, learning-oriented adults saw learning as good in and of itself, and experienced education as a constant rather than a periodic activity. Houle suggested that these three types were not mutually exclusive, and that the best way to represent them visually would be as three circles overlapping at the edges. Despite its widespread acceptance, however, Houle's typology has not been without its critics. For example, Boshier and Collins (1983) tested it with a large database, and found it was too simplistic to aid in understanding adults' motivation to learn (see also Gordon, 1993).

Nevertheless, in the past half-century, many instruments and studies based on Houle's taxonomy have collectively provided a reasonably clear general picture of adult and older learners' motivation to participate in education. Notably, Boshier's (1971) Education Participation Scale (EPS), which elaborated on Houle's typology, has become standard in the field and been used in numerous studies that have provided detailed information about older learners (Brady & Fowler, 1988; Bynum & Seaman, 1993; Furst & Steele, 1986; Kim & Merriam, 2004; Mulenga & Liang, 2008; Scala, 1996; Tasy, 2007; Tsu, 2004; Wolfgang & Dowling, 1981). In most of these studies, older learners' primary motivations can be grouped into three main categories: cognitive interest, self-development, and social interaction. Arguably the most important of these is cognitive interest (or a desire to learn), whether in non-formal educational settings (Brady & Fowler, 1988; Bynum & Seaman, 1993; Kim & Merriam, 2004; Scala, 1996; Tasy, 2007; Tsu, 2004; Wei et al., 2006) or formal settings, albeit this is most apparent at the college level (Dellmann-Jemkins & Papalia-Finlay, 1983; Kingston, 1982a; Mulenga & Liang, 2008; Romaniuk & Romaniuk, 1982). Kim and Merriam (2004) investigated 189 students at a Learning in Retirement institute and found that cognitive interest appeared to be the strongest motivator for learning, followed by social contact. In the specific case of southern Taiwan, Hsieh (2016) investigated 412 adult learners aged 65 and over and the results also revealed cognitive interest as their primary motivation for learning.

Some researchers have argued that personal growth and satisfaction should be among older adults' primary motivations for learning. The

terms used for sub-components of this motivational category have included enrichment, enjoyment, sense of accomplishment, and self-esteem (Furst & Steele, 1986; Little, 1995; Mulenga & Liang, 2008; Pritchard, 1979; Steele, 1984). Additional studies have found that older adults tend to choose personal interest courses over other types of adult education activities, and to value learning as a form of self-development (American Council for Education, 2007). Scala (1996) suggested that cognitive interest and personal growth/satisfaction both represent IM, on the grounds that they 'lie within the act of learning itself, or are so closely related to it that the process of learning appears to be the goal' (Kingston, 1982b, p. 45).

Finally, some studies have focussed on the importance of social contact or other social interaction to older adults' learning motivation (Chen, 2004; Chiu, 1987; Kim & Merriam, 2004; Mulenga & Liang, 2008; Spouse, 1981), though Wolfgang and Dowling (1981) found that social contact motivated older students to a lesser degree than younger ones.

One important theme that has emerged from these studies is that older learners' motivation tends to be intrinsic, or as Houle's typology would categorise it, learning-oriented. However, as Boshier and Collins (1983) noted, Houle's typology is too simplistic to explain adult learners' motivation; perhaps for this reason, deep explorations of the learning-oriented motivation of older learners have been rare. Rather, most existing studies focus on older learners' reasons for participating in education, without giving due consideration to the reasons underlying motivational forces.

In short, the current literature suggests that older adults' motivation to learn is primarily intrinsic, especially in regard to cognitive interest/mental stimulation and self-development, though social contact may also play an important role. As such, a more detailed framework of motivational forces is needed to gain a fuller understanding of the intrinsic aspects of these learners' motivation to learn.

IM and a conceptual framework

One popular approach in investigating learners' motivations is to determine whether they are intrinsic or extrinsic. According to Deci (1975), IM refers to engaging in an activity for its own sake, and/or the pleasure and satisfaction derived from such participation;

extrinsic motivation refers to a broad array of behaviours in which activities are engaged in not for reasons that are inherent in them but for instrumental reasons. Based on existing findings that older adults' learning motivation is an intrinsic tendency, IM theory was identified as the general framework to guide the present study. IM is a common measure of traditional learners' motivation. Specifically, the IM theory of Vallerand et al. (1989) was utilised because of its focus on cognitive-oriented motivations, which were found to be a primary motivation for older learners in previous studies. Vallerand et al. proposed a tripartite taxonomy of IM: IM to know, IM to accomplish things, and IM to experience stimulation. 'IM to know' was defined as engaging in an activity for the pleasure and satisfaction experienced while learning, and exploring or trying to understand something new; 'IM to accomplish' as deriving pleasure and satisfaction from trying to be better and reach new personal objectives; and 'IM to experience stimulation' as seeking stimulating sensations that arise from carrying out an activity (Vallerand et al., 1992). However, few researchers have adopted this perspective in exploring older learners' motivation. One noteworthy exception was Stephan, Fouquereau, and Fernandez's (2008) study of active retirees, which confirmed that participants' IM to know, to accomplish, and to experience stimulation were all higher than their extrinsic motivations.

However, Vallerand et al.'s (1989) work lacks one aspect of social interaction that is a vital part of older adult learners' motivation. For this reason, our study supplements Vallerand et al. with socioselective theory (SST) (Carstensen, 1991), which highlights the importance of social-emotional motivation of older adults and viewed it as their intrinsic motivations. According to Carstensen (1991), older adults' perception of time is present-oriented; therefore, there is increased salience of emotional motivation in later adulthood. In contrast, young adults' perception of time is future-oriented, so their motivation is toward acquiring new knowledge. In addition, Carstensen's theory argues that social emotional motivation is a drive to establish intimacy and good feelings about oneself, and can be subdivided into two parts: emotional regulation and generativity. The former refers to the better self-control of emotions in everyday life, and the latter to becoming a 'keeper of meaning' (Vaillant & Milofsky, 1980).

Thus, an extensive review of the literature on older adults' motivation to learn was used as the basis for this study's conceptual framework (see

Figure 1), including its sets of personal and institutional predictors. This review pointed to the existence of five IM constructs that could be utilised as a new framework for exploring older learners' motivation (Figure 1): learning for new knowledge, learning for a sense of accomplishment, desire for stimulation, emotional regulation, and generativity. Among these constructs, learning for new knowledge, learning for a sense of accomplishment, and desire for stimulation were derived from Vallerand et al.'s taxonomy of IM (1989); meanwhile, emotional regulation and generativity, which have been demonstrated to be salient for older adults, were derived from socio-emotional selectivity theory (Lang & Carstensen, 2002), since generativity goals have been found to be most prominent in later adulthood (McAdams, Hart, & Maruna, 1998).

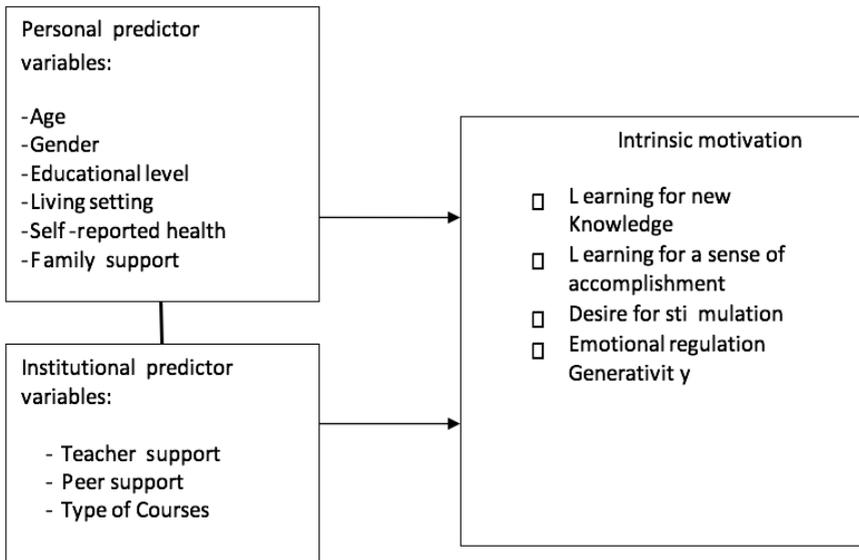


Figure 1. Conceptual Framework.

Predictors of motivation

The demographic characteristics found to predict older learners' motivation to learn include being female, married, and highly educated (Bynum & Seaman, 1993; Kim & Merriam, 2004; Lamb & Brady, 2005; Lamdin & Fugate, 1997; Manheimer et al., 1995; Mulenga & Liang, 2008; Scala, 1996). Health status has also been found to play an

important role in influencing older adults' motivation to learn (Lamdin & Fugate, 1997). In addition, several researchers have suggested that learning environments, especially classroom support such as teacher or peer support, can disproportionately impact older adults' learning. Taylor and Rose (2005), in a study of strategies for the successful engagement and retention of ICT learners aged 45 and above, found that such learners highly value peer support, mentoring, and tutoring. Also, Chu's (2010) research on adult e-learners over 45 revealed that peer support and family support both had profound impacts on their learning. Furthermore, Chappell et al. (2003) suggested that it is important for facilitators to develop a supportive climate that is safe, non-threatening and less formal while guiding older learners.

Building on the literature cited above, the present study analyses the relationships of older learners' IM with two major categories of predictor variables – personal (namely age, gender, educational level, health status, living setting, and family support) and institutional (namely teacher support, peer support, and course type) – with the aim of exploring (a) the IM of older learners in Taiwan and (b) the separate and joint effects of these personal and institutional predictor variables on this group's IM.

Methods

Setting

The present study's sample was drawn from participants in classes at the Learning Resource Centers for the Active Elderly (LRCAE), the most organised and numerous education-oriented settings for older learners provided by the Taiwanese government (Ministry of Education, 2006). The classes that LRCAE offers are varied (e.g. life skill courses, expressive courses, volunteering-related courses, and spirituality-related courses) and most are offered free of charge. Because of LRCAE's wide geographic spread and large overall size, it is more representative of Taiwan's population of such learners than any other similar organisation.

Approach and sample

This study adopted a quantitative, survey-based approach because a large sample size was desired and because of the ease of access and

dynamic interaction that such an approach provides (Dillman, 2000). The Institutional Review Board (IRB) of University of Georgia in the US gave approval. Data collection consisted of a confidential, self-administered, web-based survey. The researchers sent letters and made phone calls to all LRCAEs in Taiwan in order to recruit participants, and those instructors who agreed to distribute the survey to their students were sent the electronic survey by email. The email included information for participants, a hyperlink to the survey's start page, and a consent form, which were then shared with the students. Of the approximately 2,100 adult learners who were approached, a total of 816 responded to the questionnaire.

The final sample was 32.4% male and 67.6% female, with an average age of 68.0 (age range 50–94; SD = 8.3). The average age of the male participants (M = 69.68 years old) was significantly higher than that of females (M = 67.06 years old) ($p < .05$). Nearly half (46%, $n = 372$) the participants of both sexes had less than an elementary-school diploma, and only 6% ($n = 5$) had a master's degree or above. This closely reflects the current educational distribution of older adults in Taiwan. These and other details of the sample's characteristics are provided in Table 1.

Table 1. Sample characteristics

Background characteristic		Frequency	
		n	%
Gender	Male	259	32.4
	Female	540	67.6
Educational level	Little or no formal education Element	109	13.7
	Elementary	263	33.0
	Junior high	127	15.9
	High school	158	19.8
	Bachelor's	135	16.9

	Master's and above	5	0.6
Living setting	Rural	402	51.4
	Suburban	92	11.8
	Urban	288	36.8
Self-reported health status	Excellent	58	7.20
	Good	336	41.7
	Fair	359	44.6
	Poor	52	6.5
Course type	Instrumental classes	212	34.6
	Expressive classes	401	65.4

Note. Due to missing values, some of the within-category participant totals are all less than 816.

Measures

The instrument used in this study was translated into Mandarin from English through a back-translation process completed by two bilingual advanced doctoral students in an aging-related field. It was divided into three sections covering IM, personal predictor variables, and institutional predictor variables, each of which is described more fully below.

IM

The IM constructs were measured by 28 items rated via Likert-type scales, with responses ranging from 1 (not important) to 5 (very important). Each construct's items were adapted from two psychometrically validated instruments. The IM constructs learning for new knowledge, learning for a sense of accomplishment, and desire for stimulation were each measured with five items adapted from Guay, Mageau, and Vallerand's (2003) Global Motivation Scale (GMS). A sample item for learning for new knowledge was, 'I like to make interesting discoveries'. A sample item for learning for a sense of accomplishment was, 'When I am learning, I feel proud of the things I can accomplish'. A sample item for the desire for stimulation was, 'I like to learn because it exercises my brain'. In addition, the six items covering emotional regulation (e.g. 'Learning helps me understand my own feelings') and the seven covering generativity (e.g. 'Learning enables me to teach other people important things') were all

adapted from Lang and Carstensen's (2002) instrument for measuring emotional regulation and generativity.

Items taken from the original sources were refined and reworded to render each item appropriate for adults aged 50 and over. The IM questionnaire was reviewed by academic professionals who provided feedback on the items, and revisions were made to the items and categories. The final version of the survey contained 28 items, with an overall inter-item reliability (Cronbach's α) of .88.

Personal predictor variables

Personal predictor variables included six demographic variables: age, sex, educational level, living setting, family support, and self-reported health status. Self-reported health status was measured by asking the participant to rate his or her own health on a scale of 1 to 5 (1 = poor health; 5 = excellent health).

Institutional predictor variables

A total of twelve items covering two of these three variables – teacher support (seven items) and peer support (five items) – were adopted from Williams and Deci's (1996) Learning Climate Questionnaire; the Cronbach's α of these two dimensions were .91 and .88, respectively. Sample items included 'My instructor provides me choices and options', and 'My peers always give me positive feedback.' Each item was rated on the same five-point scale as the IM items. The course type was recoded from four categories (life skill courses, expressive courses, volunteer-related courses, and spirituality-related courses) into two groups (instrumental courses = '1,' expressive courses = '2') based on Londoner's (1971) taxonomy of adult learners' needs, as described in Table 1. According to Londoner (1971), expressive courses are related to experiences designed to increase one's enjoyment of life; instrumental courses are designed for effective mastery of old-age challenges.

Results

Intrinsic learning motivation of older Taiwanese adults

The respondents' average scores on all five of the questionnaire's IM

constructs were high (see Table 2). At 4.05/5, the highest mean score was of desire for stimulation. The lowest, at 3.90/5, was of learning for new knowledge. The two items measuring IM that received the highest scores were 'Learning makes me feel happy' and 'Learning gives me an opportunity to exercise my brain,' both of which were measurements of a desire for stimulation.

Table 2. Ranking of Intrinsic-Motivation dimensions

	Master's and above	5	0.6
Living setting	Rural	402	51.4
	Suburban	92	11.8
	Urban	288	36.8
Self-reported health status	Excellent	58	7.20
	Good	336	41.7
	Fair	359	44.6
	Poor	52	6.5
Course type	Instrumental classes	212	34.6
	Expressive classes	401	65.4

Note. Due to missing values, some of the within-category participant totals are all less than 816.

The scree plots of the principal factor analyses of the respondents' five IM constructs showed that one main factor was generated; thus, all five constructs can be combined as one factor. Moreover, two factors' eigenvalues were > 1 . The first, which the researchers named cognitive-oriented IM, included the items that targeted learning for new knowledge, desire for stimulation, and learning for a sense of accomplishment (Cronbach's $\alpha = .94$). The other, named social-oriented IM, included the items for generativity and emotional regulation (Cronbach's $\alpha = .93$).

The predictors of IM

To analyse the relative predictive strengths of the selected personal and institutional predictor variables, the five constructs of IM were combined into an overall IM score. As shown in Table 3, Pearson correlations indicated that family support ($r = .45, p \leq .01$), self-reported health status ($r = .168, p \leq .01$), educational background ($r =$

.075, $p \leq .05$), teacher support ($r = .644$, $p \leq .01$), and peer support ($r = .632$, $p \leq .01$) were all positively and significantly correlated with older learners' overall IM. Conversely, age ($r = -.084$, $p \leq .05$) was negatively correlated with IM. That is, those participants who were younger showed significantly greater overall IM.

Table 3. Correlations of main variables

	IN	FS	GE	AGE	HEA	EDU	LS	CT	TS	PS
IN	1									
FS	.448**	1								
GE	.069	.083'	1							
AGE	-.084'	.020	-.130**	1						
HEA	.168**	.161	-.007	-.114**	1					
EDU	.075*	.044	-.060	-.442**	.177**	1				
LS	.049	-.063	.120**	-.198**	.078'	.459**	1			
CT	.033	.091	.122'	-.003	.132'	.061	.087'	1		
TS	.644**	.459**	.055	-.039	.179**	.085*	.038	.068	1	
PS	.632**	.481**	.030	.006	.163**	.002	-.061	.075	.642**	1

Note. IN: Intrinsic motivation; FS: family support; GE: gender; AGE: age; HEA: self-rated health status; EDU: educational background; LS: living setting; CT: course type; TS: teacher support; PS: peer support; **($p \leq .01$), *($p \leq .05$)

To understand the significance of personal and institutional predictors of older adults' IM, a series of hierarchical regression analyses were performed based on the above findings, with cognitive-oriented IM, social-oriented IM, and overall IM as the dependent variables. Tables 4 and 5 present the results of regression analysis based on the proposed model.

Table 4. Hierarchical regression, cognitive and social-oriented Intrinsic Motivation and predictors

Predictors	Cognitive-oriented intrinsic motivation		Social-oriented intrinsic motivation	
	Model 1	Model 2	Model 1	Model 2
	β	β	β	β
Personal predictors				
Age	-.099 [*]	-.088 ^{**}	-.112 [*]	-.097 [*]
Gender	.024	.025	-.007	.002
Educational level	.018	.001	-.042	-1.48
Self-rated health	.168 ^{***}	.097 ^{**}	.132 ^{**}	.060 [*]
Living setting	.120 ^{**}	.089 ^{**}	.107 [*]	.084 [*]
Family support	.366 ^{***}	.050	.420 ^{***}	.109 ^{**}
Institutional predictors				
Course type		-.046		-.075 [*]
Teacher support		.460 ^{***}		.399 ^{***}
Peer support		.282 ^{***}		.334 ^{***}
<i>F</i>	24.988 ^{***}	72.554 ^{***}	25.9 ^{***}	71.287 ^{***}
<i>Adjusted R</i> ²	.209	.541	.215	.537

Note. ***($p \leq .000$), **($p \leq .01$), *($p \leq .05$)

Table 5. Hierarchical regression, overall Intrinsic Motivation and predictors

Predictors	Over all intrinsic motivation	
	Model 1	Model 2
	β	β
Personal predictors		
Age	-.086*	-.061
Gender	-.025	-.014
Educational level	.003	-.011
Self-rated Health	.127**	.061*
Living Setting	.061	.044
Family Support	.446**	.098**
Institutional predictors		
Course type		-.051
Teacher support		.430***
Peer support		.322***
<i>F</i>	29.624***	83.010***
<i>Adjusted R</i> ²	.238	.569

Note. ***($p \leq .000$), **($p \leq .01$), *($p \leq .05$)

As seen in Table 4, one regression analysis was conducted with cognitive IM as the dependent variable and one was conducted with social IM as the dependent variable. In Model 1 of both these analyses, gender, age, educational level, living setting, self-reported health, and family support were entered as personal predictor variables. The resulting R^2 in these analyses were .209 and .215, respectively, indicating that all these personal predictor variables taken together accounted for 20.9% and 21.5% of the variance in cognitive-oriented and social-oriented IM, depending on the analysis. The coefficient value for age showed that it had an inverse association with cognitive-oriented and social-oriented IM. The coefficient values for living setting, family support, and self-rated health, on the other hand, all indicated positive relationships with cognitive-oriented and social-oriented IM.

In both regression analyses in Table 4, the institutional predictor variables of teacher support, peer support, and course type were added on top of the personal predictor variables, with cognitive-oriented and social-oriented IM again being the dependent variable. The resulting values of R^2 were .541 and .537, respectively, indicating that the combined set of predictor variables accounted for 54.1% and 53.7%, respectively, of the variance in cognitive-oriented and social-oriented IM. The increment due to adding the institutional predictor variables on top of the personal ones was also significant ($\Delta R^2 = .331$, $p \leq .000$; $\Delta R^2 = .321$, $p \leq .000$). The magnitude of the respective changes in R^2 in Model 1 to Model 2, .331 and .321, implies that the institutional predictor variables accounted for 33.1% and 32.1% of the respective variance in cognitive-oriented and social-oriented IM. The coefficient value for age in Model 2 remained negatively associated with cognitive-oriented and social-oriented IM, while those for self-reported health, teacher support, and peer support all had positive relationships with cognitive-oriented and social-oriented IM.

The implications of the analyses shown in Table 4 are that the inclusion of the institutional predictor variables in the equation significantly improved the explanation for the variance in cognitive-oriented and social-oriented IM. Specifically, the magnitude of the age, self-rated health status, living setting, and family support coefficients are diminished from Model 1 to Model 2, revealing that institutional predictor variables diminish the impact between these variables and cognitive-oriented/social-oriented IM.

In Table 5, the dependent variable is overall IM. For the first model, the personal predictor variables of gender, age, educational level, living setting, self-reported health, and family support were entered in Model 1. The resulting value of R^2 was .238, indicating that all these personal predictor variables taken together accounted for 23.8% of the variance in overall IM. The coefficient value for age showed that this variable had an inverse association with overall IM. The coefficient values for family support and self-rated health, on the other hand, both indicated positive relationships between these variables and overall IM.

In Model 2 of Table 5, the institutional predictor variables of teacher support, peer support, and course type were added to the personal predictor variables, with overall IM again being the dependent variable.

The resulting value of R^2 was .569, indicating that the combined set of predictor variables accounted for 56.9% of the variance in overall IM. The increment due to adding the institutional predictor variables to the personal ones was also significant ($\Delta R^2 = .331, p \leq .000$). The magnitude of the change in R^2 from Model 1 to Model 2, .331, implies that the institutional predictor variables accounted for 33.1% of the variance in overall IM. The coefficient value for age in Model 2 is no longer associated with overall IM, while the coefficient values for self-reported health and family support, teacher support, and peer support all had positive relationships with overall IM.

Thus, Table 5 shows that the inclusion of the institutional predictor variables in the equation significantly improved the explanation for variance in overall IM. Specifically, age is no longer significant, and the self-rated health status and family support coefficients are diminished from Model 1 to Model 2. This result reveals that institutional predictor variables diminish the impact of age, self-rated health status, and family support on overall IM.

Discussion

The primary goal of this study was to explore older learners' IM, and its secondary goal was to identify the predictive power of personal and institutional variables such as peer support, teacher support, and course type. On both fronts, its important findings warrant attention from both researchers and practitioners.

First, the 816 sampled learners reported high levels of all five subtypes of IM (mean = 3.97/5), with desire for stimulation being the most important of these subtypes and learning for new knowledge the least important. This is consistent with prior findings that cognitive interest is the primary motivation of older learners (Hsieh, 2016; Kim & Merriam, 2004), and further suggests that this cognitive interest consists primarily of learning for stimulation as opposed to a desire for new knowledge. Additionally, consistent with socio-emotional selectivity theory, generativity was found to be more important than a desire for new knowledge, reinforcing the idea that social-emotional motivation is more salient in older adults. Interestingly, the item 'Learning makes me feel happy' received the highest score of any survey item in the present research. This should serve as a reminder that the emotional aspect of

motivation in older learners is very important, a point that warrants exploration in future research.

Second, the present study's factor-analysis results imply that older learners' IM consists of both cognitive-oriented and social-oriented aspects, and that these two components should be valued equally when considering older adults' motivation to learn. This is at odds with previous findings that cognitive interest is a stronger motivator for older learners; for example, Kim and Merriam (2004) and Hsieh (2016), the latter of which focussed on older learners in southern Taiwan.

Third, institutional variables – especially teacher support and peer support – can substantially affect older learners' IM in classroom settings, as confirmed by the hierarchical regression analysis. This echoes the work of Delahaye and Ehrich (2008) and Donaldson (1999), who found that older learners preferred encouraging instructors who were able to stoke students' learning motivations. In addition, the current study confirmed the importance of autonomy-supportive environments to increases in IM (Chappell, Hawke, Rhodes, & Soloman, 2003; Fry, 1992; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). This is an especially important point for educators, as it implies that teacher and peer support are key to enhancing older learners' motivation to learn.

Finally, the results show that institutional predictors, especially peer support and teacher support, can decrease the negative impacts of old age and poor self-reported health status on older adults' motivation to learn. These negative impacts were found in previous studies such as Mott (2008) and Sloane-Seale and Kops (2007). The latter, for example, compared active and non-active older learners and found non-active learners are generally older and less healthy. Our finding sheds further light on the importance of contextual/environmental factors to older adults' learning.

These findings have many important implications. To encourage more older adults to enjoy and persist in learning, it is important to recognise both the cognitive and social aspects of their IM. It is also crucial to provide an environment that includes the support of peers as well as teachers to enhance their learning experiences. Therefore, the training for the teachers of these adults should: highlight the teacher–learner relationship in learning settings; build teacher–learner and learner–learner relationships, and even relationships between teachers and

learners' families; and establish a collaborative learning process that supports continued learning for older adults.

The most important implication, however, is that vulnerable older adults' learning motivation should receive greater attention. Such learners – for example, those in poor health, and/or extreme old age – have lower motivation to learn, but the present study suggests that this motivation to learn can be enhanced with support from teachers, peers, and the learners' families. With this in mind, it is especially necessary to develop a support system for this group, which has the most to gain from learning motivation enhancement.

Despite these important findings, this study's potential limitations should be noted. First, no assessment of or comparison to extrinsic motivations was conducted. Future studies should also measure extrinsic motivations for a deeper understanding of older adults' motivation to learn. Second, the survey tool used in this study was adapted from elements of other tools, but was itself not subjected to psychometric testing, only validation by content experts. Third, the research design was cross-sectional, and thus did not allow for comparisons between those who persisted in their learning programs and those who did not. Future qualitative research could be conducted to complement these results and further the understanding of older learners' motivations. Lastly, the participants in this study were all recruited from Taiwan, and from a particular educational setting (LRCAE); therefore, the mechanisms and dynamics of their learning motivations might not be generalisable to older adults in other countries or different Taiwanese learning programs.

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