The impact of fear of losing out (FoLO) on college students' performance goal orientations and learning strategies in Singapore

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Abstract

The current research investigated the influence of the *Fear of Losing Out* (FoLO) mindset on learning strategy via performance goal orientation and its interaction with social comparison amongst Singaporean college students. In Study 1, a positive relationship between FoLO and performance goal orientations (i.e., avoidance and approach) was found. Study 2 replicated this finding and further revealed a downstream effect of FoLO on surface learning via performance goal orientations. In addition, social comparison moderated the link between performance goal orientation and surface learning in the mediation model. Specifically, in downward social comparison conditions, FoLO facilitated high performance-avoidance goal orientation, which in turn led to higher surface learning. Comparatively, in upward social comparison conditions, FoLO incited high performance-approach goal orientation, which in turn led to lower surface learning. Taken together, the findings yield significant theoretical and practical implications of FoLO on college students' goal orientations and learning outcomes.

Keywords Fear of losing out (FoLO) · Kiasu · Singapore · Performance goal orientation · Learning strategy

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1 Introduction

Singaporean students are well-known for their academic performance throughout the world. According to the results from the Performance for International Student Assessment (PISA), Singaporean students performed far above average on reading literacy, mathematics, and science (OECD, 2018). Similarly, the Trends in International Mathematics and Science Study also found Singaporean students in the top rank for their performance (H. M. Ang, 2019; Teng, 2016). These high scores were attributed to a culture of meritocracy in Singapore and high-stakes examination system in the Singapore education system (Deng & Gopinathan, 2016). In light of these observations, Singapore has undoubtedly succeeded in nurturing their young generations to perform well on examinations.

However, Singaporean students' academic excellence is often accompanied by a fear of failure. In a 2019 OECD report, 72% of Singaporean students reported being afraid of failure (Avvisati et al., 2019) and Singapore ranked ninth out of 37 OECD member countries in their fear of failure (Avvisati et al., 2019; Wong, 2019). Additionally, Singapore's Institute of Mental Health has reported an increasing number of students, between the ages of six to eighteen, seeking help for school-related stress, anxiety, or depressive disorders (H. M. Ang, 2019; Cheow, 2019). As a disclaimer, this rising trend does not necessarily denote increasing anxiety in students. Rather, it may imply that students are more willing to ask for help (Cheow, 2019). Regardless, the escalating number of students seeking help paints a picture of the tremendous pressure that Singaporean youths are under.

Although the Singaporean government has made continuous efforts to mitigate academics related fear and stress, this focus on examinations and scores rather than the learning experience is deeply entrenched within the society. In fact, such excessive concern over scores amongst Singaporean youths has been of concern since the 1980s (Ho et al., 1998) and as recently as 2019 (H. M. Ang, 2019; Tham 2016). For long, Singaporean youths have been criticized for their high obsession over grades and low interest in intellectual pursuit (Singapore Advisory Council on Youth, 1989). Combined, these observations emphasize Singaporean students' focus on the end goal at the expense of their learning experience. This is a problematic attitude as the pursuit of good grades as the dominant measure for academic success may detrimentally impact students' attitude and approach towards their education in Singapore (Lim, 2015). This issue could be even more pernicious in the tertiary education system—where students are supposed to gain intellectual capability including knowledge, skills, epistemic curiosity and critical thinking for their future career and life. College students' learning should be compelled more by personal growth motives than merely getting good grades.

Singaporean students' obsession with grades can be partly attributed to the influence of a prevalent cultural norm of Singapore, Kiasu, a colloquial term that commonly translates to the Fear of Losing Out (FoLO, Cheng & Hong, 2017). With the constant concern over the failure of keeping up with others, students high in FoLO have been found to be associated with lower academic satisfaction despite higher academic performance (Ho et al., 1998; Kirby & Ross, 2007). Despite the prevalence of FoLO in Singapore and its potential influence in students' learning, very little is

known about this construct empirically. In short, the present paper seeks to examine the impact of FoLO on college students' performance goal orientation, thereby influencing their learning strategy. Lastly, social comparison was investigated as a moderator in the proposed mediational relationship.

1.1 Uncovering the concept of FoLO

1.1.1 FoLO (Kiasu) Singaporeans

A colloquial term in Singapore, 'Kiasu', an indigenous construct corresponding to Fear of Losing Out (FoLO; Cheng & Hong 2017; Ho et al., 1998). 'Kiasu' originates from Hokkien (a Chinese dialect), and literally translates to 'fear of losing out' (Ho et al., 1998). The variant term 'Kiasu' refers to a trait, value, or mindset in Singapore. For many Singaporeans, Kiasu is a modus vivendi and not just an occasional slip (Cheng & Hong, 2017). According to Hwang et al. (2002, p. 75), Kiasu (FoLO) refers to an "obsessive concern with getting the most out of every transaction and a desire to get ahead of others". Describing Kiasu (FoLO) in reference to a rice bowl, Singaporeans are not only fixated with ensuring that the "bowl is filled with rice", but that there is "more than enough to be stored" (Chuah, 2013). Taken together, Kiasu (FoLO) involves a constant apprehension of securing one's share from a limited resource. In other words, this FoLO mentality involves a constant concern that there would be no more resources for them if they do not take action.

As a pioneer in the study of FoLO, Ho et al. (1998) regarded FoLO as a behavioural tendency. In their study, FoLO was measured through the frequency of the ten commonly cited FoLO behaviours (e.g., "Rushing for train/bus seat" and "Bringing back hotel toiletries"; Ho et al., 1998, p. 365). The behaviours typically depicted extreme scenarios which stem from the fear of losing out, selfishness, calculative nature, and greed (Ho et al., 1998). Hwang et al.(2002) similarly defined and measured FoLO as a behavioural tendency (e.g., "piling up food"). Thenceforth, FoLO was largely construed as one's behavioural tendency in the early stage of research (Hwang et al., 2002; Kirby et al., 2010; Kirby & Ross, 2007).

More recent investigations adopted a different operationalization: FoLO as a mindset or mentality (Wee et al., 2022). Although FoLO is often understood as a behavioural construct, Goh (2013) pointed out that the identified FoLO behaviours may not capture all instances of Kiasu. Moreover, existing measures of FoLO behaviours do not elucidate the underlying motives that drive the FoLO behaviours (Goh, 2013). Along the same vein, Bedford and Chua (2018) delineated FoLO as a mentality, acknowledging that the same observable 'FoLO-related behaviour' can be identified as both a FoLO and a non-FoLO behaviour depending on one's motivation that underlies the action. In short, capturing individual levels of FoLO simply through one's behavioural is inadequate and is prone to error.

In the current paper, we follow the more recent definition of FoLO as a mindset (Wee et al., 2022). As previous papers highlighted (Bedford & Chua, 2018; Goh, 2013), behaviours alone are insufficient to accurately assess individual differences in FoLO. The same behaviour may have different underlying psychological processes, depicting totally different motives. Considering the behaviour of doing schoolwork

way ahead of time, this behaviour can be deemed as FoLO only when it is accompanied by a concern that one will fall behind one's peers in school. However, without this underlying FoLO mindset, this behaviour might simply be a portrayal of one's diligence or conscientiousness. Therefore, the present studies will operationalize FoLO as a mindset, rather than a set of behaviours.

FoLO is considered as a cultural norm of Singapore, and is consistently ranked as the top Singaporean characteristic (Devadas, 2018; Tan, 2015; Tay, 2012). This long grounded Kiasu is described as inescapable and quintessential to Singaporeans (Pierson, 2019). With very limited resources and land, Singaporeans have had to make extra effort to protect and sustain themselves from larger neighbouring countries, such as Malaysia and Indonesia (Pierson, 2019). Therefore, as a small nation in a large world, Singaporeans inevitably adopted the FoLO mindset to survive (Pierson, 2019). Singapore's endorsement of meritocracy as a national principle meant that the societal margin for success is narrow (Ho et al., 1998). With this, exemplary examination scores in the high-stakes examination system serve as a valuable resource for future success since young age in Singapore (Davie, 2016). This pits students against each other, leading to an intense FoLO for this resource. For example, private tuitions are considered as a necessity as parents fear their children might lose out (Ho et al., 1998; Seah et al., 2019). Singaporean youths have also been found to be high in FoLO with regards to their academics. The rigid educational system "domesticates" students to focus chiefly on attaining good end-results (Chuah, 2013), and this can only be achieved by not losing out to their peers. In fact, Singaporean adolescents have been found to experience more anxiety over examinations than COVID-19 lockdowns (J. Ang, 2020). This finding clearly illustrates the students' fear of falling behind, reflecting a FoLO mindset. This FoLO mentality continues in college as well. FoLO college students have been found to engage in extreme behaviours such as, sourcing supplementary study materials, receiving tuition and sandbagging (i.e., "pretending to do worse than you are to fool others"; Bedford & Chua 2018, p. 11).

1.1.2 FoLO outcomes

Previous research has suggested that FoLO might be beneficial in some aspects but is often associated with negative behaviours and life outcomes (Wee et al., 2022). On the positive side of FoLO, Ong and Cheng (2017) found that individuals with high FoLO were more likely to be high in perseverance, an important trait for academic success. Adding on, Kirby and Ross (2007) found that higher general FoLO tendencies in American college students were significantly associated with higher examination scores. Kirby et al., (2010) found a positive association between FoLO and Maximization – a decision-making propensity to maximize successful outcomes (Schwartz et al., 2002). While there are pros and cons of Maximization, studies have found that Maximizers generally possess lower life satisfaction and happiness due to their constant concern for optimal results (Schwartz et al., 2002). On the negative side, higher levels of FoLO in students are associated with less satisfaction in their academic grades, regardless of their actual performance (Ho et al., 1998), lower level of creativity (Cheng & Hong, 2017; Goh, 2013), and lower self-esteem (Wee et al., 2022).

1.2 Impact of FoLO on achievement goal orientation and learning strategy

1.2.1 Achievement goal orientation

Achievement goal orientations refer to students' tendencies for engaging in various academic achievement behaviours for different tasks. There are two types of achievement goal orientations: mastery goals and performance goals. Individuals with a mastery goal tend to focus on growth, development, learning throughout the process, and gaining personal insight from experience (Dweck, 1986). Students with a mastery goal orientation are more intrinsically motivated to acquire skills and knowledge (Cerasoli & Ford, 2014), and seek out feedback to improve their learning (Ames, 1992). Contrarily, individuals with a performance goal focus on the end-results; these individuals care less about personal growth throughout the task and more about one's performance (Dweck, 1986). These students aspire to outperform others and to avoid negative judgements of their ability (Dweck, 1986). Research on mastery goals and performance goals have shown that these distinct goals have different effects on cognitive processing (Elliott & Dweck, 1988; Nolen, 1988), learning experience (Darnon et al., 2007), and achievement outcome (Dweck, 1986; Elliot & Hulleman, 2017; Harackiewicz et al., 1998). While findings on mastery goal orientation have consistently predicted better educational outcomes, findings on performance goal orientations were found to be mixed (Ames & Archer, 1988; Meece & Holt, 1993; Nolen, 1988; Ryan & Pintrich, 1997; Skaalvik, 1997).

Regarding these equivocal findings, Elliot (1999) argued that it may be attributable to the fusion of two different components within the performance goal orientation and further divided the performance goal orientation into performance-approach and performance-avoidance goals. Performance-approach goal orientation reflects the desire to perform better than others (Elliot, 1999). Performance-avoidance goal orientation reflects the desire to avert from performing worse than others (Elliot, 1999). Therefore, the present paper utilized Elliot's (1999) two-component framework with performance-approach and -avoidance goal orientations.

With differing underlying motives, these goal orientations lead to disparate learning outcomes. Performance-approach goal orientation has also been found to be associated with various positive learning behaviours, including persistence, effort and academic performance (Alhadabi & Karpinski, 2020; Elliot, 1999; Harackiewicz et al., 2000). However, performance-approach goal tends to result in high anxiety (Elliot & McGregor, 1999). In contrast, performance-avoidance goal orientation has mainly been linked to negative learning outcomes, such as lower self-efficacy, consistency of interest and perseverance (Alhadabi & Karpinski, 2020), and higher disorganization (i.e., difficulty in establishing or maintaining a structured and organized approach to studying; Elliot, 1999).

1.2.2 FoLO and performance goal orientation

We propose that FoLO predicts high performance goal orientations in the current research. In an academic or task environment, the only way to resolve one's FoLO is to ensure that one has better, or at least equivalent competence compared to others. In

a typical academic setting, students are evaluated and ranked by their end-results (i.e., examination scores) rather than more intrinsic factors (i.e., interest). As the end-result determines one's success and failure in the academic setting, individuals who fear that they will 'lose out' should naturally limit their focus on superficial performance. Therefore, FoLO would lead to higher performance goal orientations endorsement.

More specifically, it appears that performance-avoidance goal—the desire to avoid falling behind—may be most relevant to FoLO. The FoLO mentality involves a prevention-oriented motivation accompanied by fear and avoidance of having lesser of something than others, be it materialistic resources or opportunities. Therefore, FoLO should lead to a heavier emphasis on one's motivation to perform at least on an equal level as their peers. In fact, FoLO has been found to lead to a similar avoidance-related tendency, a higher prevention regulatory focus (Cheng & Hong, 2017). Hence, FoLO should be positively related to performance-avoidance goal orientation.

To secure sufficient resources, the FoLO mindset also drives individuals to have more than enough resources "to be stored" for assurance and certainty of one's status (Chuah, 2013). Due to the intense fear and anxiety of potential shortage, FoLO mindset endorses a fixed-pie mindset where individuals assume the pie of resources is fixed and gaining a competitive advantage over others is critical for survival (Cheng & Hong, 2017), leading to extreme behaviours of securing excess resources, bordering on selfishness or stinginess. Applying this FoLO mindset to the academic domain, one would be compelled in mindless competitiveness and engaging in excessive studying and sourcing of study materials to resolve their fear. For example, previous research has shown that FoLO college students tend to source for additional study materials atop of the ones given in class to outperform others (Bedford & Chua, 2018). As others' progress and performance are often ambiguous, FoLO could only be resolved through overstudying and overachieving. In other words, FoLO college students will secure their performance by trying to outperform others, depicted by a performance approaching goal orientation. Thus, we predict a positive relationship between FoLO and performance-approach goal orientation.

Hypothesis 1a: FoLO will be positively associated with performance-approach goal orientation.

Hypothesis 1b: FoLO will be positively associated with performance-avoidance goal orientation.

1.2.3 FoLO, performance goals, and learning strategies

With FoLO limiting individuals to performance goal orientations, it should further influence students' learning strategy. Learning strategy largely involves surface and deep learning. Surface learning refers to rote learning of isolated facts without true understanding of the content at hand (Marton & Säljö, 1976). In contrast, deep learning is characterized by active learning, such as relating the information to one's own experience, thereby leading to a genuine comprehension of the content and proper application of the information (Marton & Säljö, 1976). Simply put, surface learn-

ing involves the mere transference of knowledge from the medium to the individual while deep learning involves one's discovery and exploration in the content (Platow et al., 2013). In comparison to deep learning, surface learning is not a committed approach of learning; it is good for grabbing factual information but not elaborative enough to extend ideas, transform information and generate meanings (Darnon et al., 2007; Platow et al., 2013). In support for this notion, recent research on medical students showed that deep approach to learning was associated with a higher quality of learning (Pandey & Zimitat, 2007). Moreover, prior research revealed that medical students who endorsed a surface learning approach were less likely to make a correct diagnosis than students who endorsed deep approach (Balla, 1990).

In this research, we hypothesized that FoLO will lead to higher levels of surface learning. According to Ho et al. (1998), "calculating" is identified as an important factor in FoLO. In order not to lose out to others, FoLO individuals tend to constantly weigh one's gains and losses when undertaking actions. Given this calculative nature, FoLO individuals tend to choose actions that lead to maximal benefits with low cost. Applying this to the learning strategies, deep learning is an inefficient strategy for FoLO individuals as it requires more time and effort while not guaranteeing high performance scores (Tooth et al., 1989). In contrast, surface learning meets the desire of FoLO individuals through minimal effort. Notably, surface approach to learning involves an instrumental motivation—make minimal expenditure to avoid failure (Figueira & Duarte, 2011). Therefore, FoLO mindset should lead to a higher use of surface learning and a lower use of deep learning.

Hypothesis 2a: FoLO will be positively associated with surface learning.

Hypothesis 2b: FoLO will be negatively associated with deep learning.

1.3 Moderated mediation model

1.3.1 Interaction of Social comparison and performance goal orientations

In the literature, social comparison is defined as thinking about one or more people in comparison to oneself (Festinger, 1954; Wills, 1981). In other words, it is the process of paying attention to the similarities and differences of oneself to others. This comparison process can be distinguished into two types: downward and upward social comparison. Downward social comparison (DSC) involves comparing oneself to an inferior other while upward social comparison (USC) involves comparing oneself to a superior other (Thornton & Arrowood, 1966; Wheeler & Suls, 2020). The two types of social comparison generally lead to different types of emotions and self-evaluations, eventually impacting individual's behaviours and responses. For instance, prior studies revealed that DSC typically results in higher positive affect, especially for individuals with low self-esteem, and more help-seeking behaviour (Aspinwall & Taylor, 1993; Klein, 2003). In terms of self-evaluations, USC is commonly assumed to result in an ego deflating effect with more negative feelings due to a sense of inferiority. But in fact, it can have an ego enhancing effect in many occasions (Col-

lins, 1996). For instance, engagement in USC has been found to lead to a positive inspiration for achievement and reflects one's interest in improvement (Thornton & Arrowood, 1966; Wheeler & Suls, 2020).

On top of these outcomes, social comparison has been found to influence individuals' motivations as well. Van de Ven (2017) has found that envy and admiration results in higher motivation to improve oneself. Similarly, Diel et al. (2021) have shown that USC leads to higher effort investment while DSC leads to self-enhancement, thereby resulting in a reduction of effort. Combined, these findings show that USC, which creates a gap between one's status and ideal, results in an increase in the motivation to close this gap through more effort and self-improvement.

Applying this to learning strategies including surface learning and deep learning, surface learning is an efficient method to enhance grades in comparison to deep learning. Surface learning refers to rote learning of isolated facts without true understanding of the content at hand (Marton & Säljö, 1976). In comparison, deep learning is characterized by active learning, such as relating the information to one's own experience, thereby leading to a genuine comprehension of the content and proper application of the information (Marton & Säljö, 1976). In short, surface learning involves the mere transference of knowledge from the medium to the individual while deep learning involves one's discovery and exploration in the content, ultimately promoting personal growth (Platow et al., 2013). Surface learning involves more memorization, which requires relatively less time and effort (Kember, 1996). When there is limited time for studying and one's learning performance will be evaluated by written exams that usually require memorization of certain information, surface learning can be a more efficient strategy for gaining high exam scores than deep learning (Kember, 1996; Platow et al., 2013). As deep learning requires thorough understanding of the topics in addition to applying and relating the subject matter, it necessitates high effort and time (Platow et al., 2013). Tying this in with social comparison, students under DSC should be more likely to engage in more surface learning and less deep learning, because DSC endeavors self-assurance and the use of surface learning (instead of deep learning) may efficiently enhance one's performance in the written exam. In contrast, those under USC should be more likely to engage in less surface learning and more deep learning, as USC compels personal improvement motivation. The use of deep learning (instead of surface learning) can help to close the gap between one's current performance and ideal performance that students strive to achieve.

Different goals would interact with social comparison to enact different effects. As introduced earlier, individuals who endorse performance goal orientations differ in whether they strive to be better (i.e., performance-approach goal orientation) or whether they strive *not* to be worse (i.e., performance-avoidance goal orientation, Elliot, 1999; Elliot & Hulleman, 2017; Linnenbrink-Garcia et al., 2012). Relating goal orientation with social comparison, USC resonates with performance-approach goal orientation more than DSC. While driven by the performance-approach goal, students who are under USC will be compelled to improve in order to catch up with their counterpart's performance and then outperform others. This combination will lead students to adopt more deep learning and less surface learning. When the social comparison condition is DSC, those with performance-approach goal lack incentives to improve themselves as they have outperformed others (Linnenbrink-Garcia et al.,

2012; Molden et al., 2016). As a result, the link between the use of any learning strategies including surface learning and deep learning will be weak among students with performance-approach orientation in DSC condition. In contrast, the motives generated by DSC may be more congruent with a performance-avoidance goal orientation than the motives generated by USC. Students driven by the performance-avoidance goal desires to avert from performing worse than others (Elliot, 1999; Elliot & Hulleman, 2017; Elliot & McGregor, 1999), when under DSC, they will be compelled to affirm their performance in order to maintain their superior performance status. In this combination, surface learning provides more utility than deep learning in securing exam performance. In comparison, when under USC, students with performance avoidance goal suffer from the nightmare of falling behind others. In this case, neither surface learning nor deep learning provides guarantee for such students to stop from falling behind. Therefore, the link between the use of any learning strategies including surface learning and deep learning will be weak among students with performance-avoidance orientation in USC condition. Supporting this proposition, individuals with performance-approach goal orientation were found to be more likely to engage in USC, while those with performance-avoidance goal orientation were found to engage more in DSC (Tian et al., 2017).

In short, it is proposed that the social comparison condition that resonates with one's performance goal orientation should lead to a synergy in the effect of either upward or downward social comparison. Therefore, individuals with different performance goal orientation should react to the social comparison that are aligned with their goals in an emphasized way. However, when the social comparison condition is not in line with individual's performance goal orientation, the individual would react in a more suppressed and diminished way. Specifically, performance-approach goal orientation together with USC should produce a synergy effect, leading to higher improvement motivation and effort. This motivation should then lead to lower use in surface learning and higher use in deep learning. In contrast, performance-avoidance goal orientation with DSC should result in a synergy effect, leading to higher surface learning and lower deep learning through the self-assurance provided by the DSC. When the social comparison and performance goal orientation are not aligned, the effect would decrease, thereby suppressing the effects of social comparison on learning strategy. See Fig. 1 for an illustration of the hypothesized moderated mediation model.

Hypothesis 3 FoLO – Performance Goal Orientation – Learning Strategy relationship will be moderated by the social comparison on the link between performance goal orientations and learning strategies.

Hypothesis 3a: Under USC, FoLO would lead to lower surface learning via performance-approach goal orientation.

Hypothesis 3b: Under USC, FoLO would lead to higher deep learning via performance-approach goal orientation.
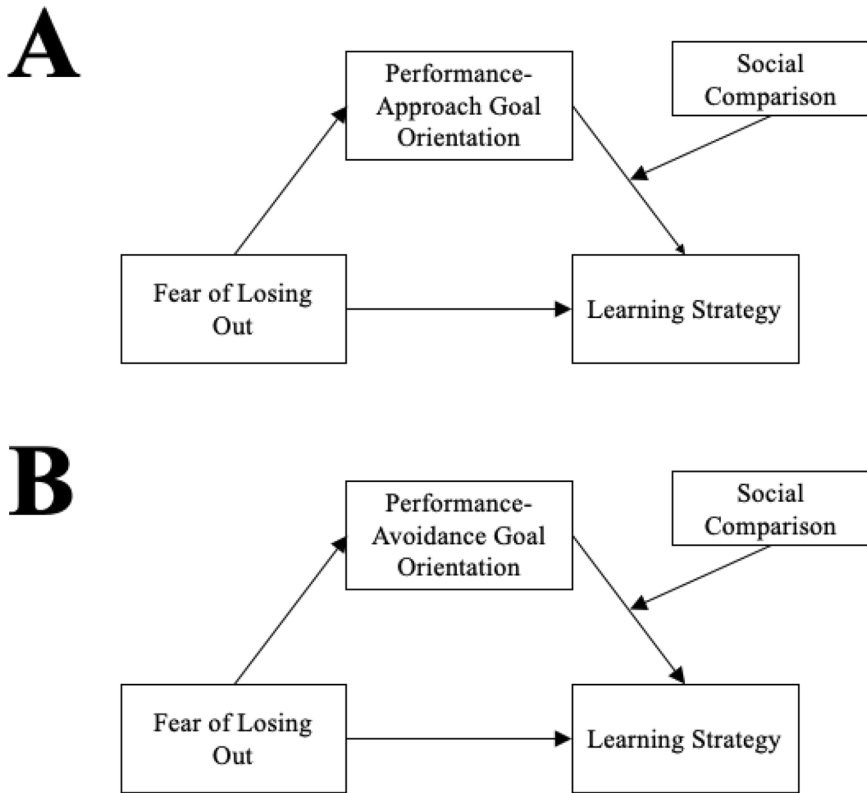
Fig. 1 Conceptual model of the proposed second-stage moderated mediation. (*Note*. Conceptual moderated mediation models with performance-approach goal (H3a-b, panel A) orientation and performance-avoidance goal orientation (H3c-d, panel B) as the mediators for moderated mediation between FoLO, Social Comparisons, and Learning Strategy)

Hypothesis 3c: Under DSC, FoLO would lead to higher surface learning via performance-avoidance goal orientation .

Hypothesis 3d: Under DSC, FoLO would lead to lower deep learning via performance-avoidance goal orientation.

In two studies, the proposed hypotheses will be tested with a sample of Singaporean college students. College students served as our target population for the exploration of FoLO on student's learning goal orientations and learning strategies in Singapore for three reasons. First, tertiary education is the apex of the competitive academic environment in Singapore. Singaporean college students have had ample of experience with FoLO in the past or even currently in their student life, which facilitates the study of FoLO's impact on students' learning processes and outcomes. Second, college students can be generally considered as higher performing students in their cohort, assumed to be interested and driven in academics. Since individuals tend to

be especially high in FoLO in what one considered to be important and valuable to oneself, college students would be an exemplary population to study FoLO in the academic setting in Singapore. Third, the purpose of tertiary education is different from basic education. Tertiary education often serves as a key transition phase to adulthood for many students where they experience greater autonomy and independence in learning (e.g., Baird 2006; Barnett, 1988; Goldscheider & DaVanzo, 1986; Trice & Dey, 1997). Prior research on higher education highlight that tertiary education institutions aim to foster a pro-independent environment that values personal autonomy and intellectual independence (e.g., Baird 1988; Baird, 2006; Trice & Dey, 1997). In this case, the influence of FoLO on college students' learning outcomes will be even more sound due to their autonomy and intellectual independence in learning.

2 Study 1

Study 1 sought to test the proposed positive relationship between FoLO and performance goal orientations amongst Singapore college students (H1a, and H1b). The current study predicted that FoLO will be positively associated with performance-approach and -avoidance goal orientation.

2.1 Methods

2.1.1 Participants

Based on an a priori power analyses of 0.80 power to detect a small effect size ($f^2 = 0.15$) through G*Power (Faul et al., 2007, 2009), a sample size of 75 was determined to be sufficient. One hundred and fifteen undergraduates from a local university in Singapore were recruited from a Subject Pool System[1] and participated in the study in exchange for course credit. Fourteen individuals who failed to answer the attention check items correctly were excluded, and the final sample size was 101. The sample consisted of 75 female and 26 male students with an average age of 21.44 ($SD = 1.98$). All participants were Singapore citizens or permanent residents. Majority of the participants were Chinese Singaporeans ($n = 82$), followed by Indian Singaporean ($n = 10$) and others including biracial or foreign ethnicity ($n = 9$).

2.1.2 Procedure and measures

The survey was conducted online and included measures of FoLO and achievement goal orientation. Participants were asked to complete a brief demographic questionnaire at the end of the study before they were fully debriefed. All study materials and experimental procedures were administered and communicated in English.

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[1] Participants from the local subject pool typically consists of students from foundational psychology courses open to the university (e.g., introduction to psychology, 100-level psychology courses and research methods). The participants in both Studies 1 and 2 are composed of students from all the majors provided in the university. Therefore, students within these foundational psychology courses are fairly representative of students enrolled at the university.

Table 1 Study 1: Means, standard deviations, range, correlation matrix and reliability statistics

	M	SD	Range	1	2	3	4	5	6
1. Age	21.44	1.98	18–26	-					
2. Gender	1.74	0.44	1–2	**-.61**	-				
3. FoLO	4.61	1.10	1–7	.00	-.01	(0.76)			
4. Performance-Approach	3.39	0.84	1–5	-.19	**.29**	**.46**	(0.86)		
5. Performance-Avoidance	3.07	1.03	1–5	-.14	**.41**	**.43**	**.57**	(0.89)	
6. Mastery	3.56	0.72	1–5	-.02	.08	-.05	.06	.05	(0.83)

Note. Gender is coded as male=1, female=2. The correlation coefficients in column 1 between Gender and all other variables of interest reflect a point biserial correlation coefficient. Cronbach's alphas are presented in parentheses in the diagonal. Significant results are marked in boldface, $p < .05$

Responses on each scale were all averaged for subsequent analyses. All study data are available online at https://osf.io/kdnyt/.

2.1.2.1 FoLO A 4-item FoLO scale by Wee et al. (2022) was used to measure FoLO mindset. The items include: "I am concerned if I miss an opportunity while others get it", "I am worried that there will be nothing left for me if others go first", "I am concerned that I will come off second best to others" and "I am concerned that I have to forgo certain benefits if I do not go first". Responses were made on a 7-point Likert scale (*1: Strongly Disagree; 7: Strongly Agree*).

2.1.2.2 Achievement goal orientation Participants were administered an 18-item Goal Orientation Scale (Midgley et al., 1998) on a 5-point Likert scale (*1: Not at All; 5: Very Much*). Sample items include "I like school work that I'll learn from, even if I make a lot of mistakes" (mastery), "I would feel really good if I were the only one who could answer the teachers' questions in class." (performance-approach) and "It's very important to me that I don't look stupid in my classes" (performance-avoidance). Although there was no hypothesis for mastery goal orientation and FoLO, we included this variable in our study for exploratory purpose.

2.1.2.3 Demographics Participants were asked to answer brief demographic questions, including their age and gender.

2.2 Results

2.2.1 Preliminary analyses

All variables were normally distributed (skewness < 1.0). Reliability analyses of the scales for all the interest variables revealed a high reliability ($\alpha > 0.70$). No gender ($t(99)=0.09$, $p=.932$) or age differences ($r=.004$, $p=.965$; $B=0.002$, $SE=0.06$, $t(99)=0.044$, $p=.965$) were observed in FoLO mindset. There were no significant age difference for both performance goal orientations ($p > .05$). However, we found a significant gender difference—females were generally more likely to endorse performance-avoidance ($r=.413$, $p < .001$, $M_{female} = 3.32$, $M_{male} = 2.35$, $t(99)= -4.52$, $p < .001$) and performance-approach goal orientations ($r=.292$, $p=.003$, $M_{female} = 3.53$, $M_{male} = 2.98$, $t(99) = -3.04$, $p=.003$) than males. Therefore, we controlled for gender in all subsequent analyses. See Table 1 for the correlation matrix.

2.2.2 FoLO and performance goal orientation

To test for the relationship between FoLO and performance goal orientations (H1a and H1b), we conducted several hierarchical regression analyses with gender in Step 1 and FoLO mindset in Step 2. In the first model, performance-approach goal orientation was entered as the dependent variable. FoLO and performance-approach goal showed a significant positive relationship ($R^2 = 0.216$, $F(1, 98)=30.28$, $B=0.53$, $SE=0.10$, $t(98)=5.50$, $p<.001$), supporting H1a. When performance-avoidance goal orientation was entered as the dependent variable, higher FoLO was also found to be significantly associated with higher performance-avoidance goal orientation ($R^2 = 0.191$, $F(1, 98)=29.28$, $B=0.62$, $SE=0.11$, $t(98)=5.41$, $p<.001$). In sum, the results supported H1a and H1b. See Table 2 for the regression coefficients.

As an exploratory investigation, we also examined the relationship between FoLO and mastery goal orientation. The results indicated that the association between FoLO and mastery goal orientation was not significant, ($r=-.045$, $p>.05$).

2.3 Discussion

Study 1 provided support for H1a and H1b. Higher levels of FoLO were associated with higher levels of performance-avoidance (H1a) and -approach goals (H1b). In other words, FoLO students reported a higher motive to avoid from falling behind their peers. At the same time, they also showed stronger desire to outperform others. These results echo the previous speculations of the result-driven Singaporean students and lend support to the assertion that FoLO would facilitate this score-driven learning motives.

In addition, as we were primarily interested in the relations between FoLO and performance goal orientation, we did not have an a priori hypothesis regarding the relations between FoLO and mastery goals. As part of our exploratory investigation, we found that there was a null relationship between FoLO and mastery goals. This suggests that FoLO is chiefly manifested on Singaporean students' concern for and pursuit of their end performance. It neither facilitates nor interferes their willingness to master new skills, to increase new understanding, and/or improving their competence. To further explore the impact of FoLO on students' learning, the relationships among FoLO, achievement goal orientation and learning strategy were explored in Study 2.

3 Study 2

Study 1 provided initial evidence for the positive link between FoLO and performance goal orientations of our model, Study 2 strove to replicate the findings in Study 1 and further test the hypothesized moderated mediation model (H3 and H3a-H3d; Fig. 1 A and 1B). Specifically, we predicted that FoLO would be associated with higher performance-avoidance (H1a) and -approach goal orientations (H1b) as shown in Study 1. Furthermore, we predicted that FoLO should lead to higher surface learning (H2a) and lower deep learning (H2b) via performance goal orientations,

Table 2 Study 1: Regression Coefficients for Goal Orientations

	Performance-Approach Goal				Performance-Avoidance Goal			
	Step 1		Step 2		Step 1		Step 2	
	B (SE)	β	*B (SE)*	β	*B (SE)*	β	*B (SE)*	β
Covariates								
Gender	**0.84 (0.28)**	0.292	**0.85 (0.24)**	0.296	**1.46 (0.32)**	0.413	**1.47 (0.28)**	0.417
Predictor								
FoLO	—	—	**0.53 (0.10)**	0.465	—	—	**0.62 (0.11)**	0.437

Note. SE=standard error. SEs are shown in parentheses. Significant results are marked in boldface, $p < .01$

depending on social comparison conditions (H3). Under USC, we expected FoLO should be associated with lower surface learning (H3a) and higher deep learning (H3b) via performance-approach goal orientation (please see Fig. 1 A). Under DSC, FoLO should be associated with higher surface learning (H3c) and lower deep learning (H3d) under performance-avoidance goal orientation (please see Fig. 1B).

3.1 Method

3.1.1 Participants

Based on an a priori power analyses of 0.80 power with G*Power (Faul et al., 2007, 2009) to detect a small effect size ($f^2 = 0.15$), a sample size of 129 was found to be sufficient. A total of 135 undergraduate students from a local university in Singapore were recruited via a Subject Pool System to complete this study. Subjects were compensated with either one course credit or SGD $5 (~USD $3.60) for participation.

Following suggestions by Meade and Craig (2012) on filtering out careless responders, participants were asked if they had responded to the survey items in a careful and honest manner. Participants who indicated that their responses were not valid were omitted ($n = 3$). Additionally, participants who spent more or less than 3 SDs below the mean time to complete the study were removed ($n = 4$; Meade & Craig 2012). The final sample size was 128 which consisted of 94 females and 34 males. The average age of the sample was 22.12 ($SD = 2.08$), and a majority of the sample were Chinese ($n = 104$), followed by Indians ($n = 16$), Others ($n = 5$), and Malays ($n = 3$).

3.1.2 Procedure and materials

Participants first completed the FoLO scale followed by a short reading comprehension task that served as a dummy task for our subsequent social comparison manipulation. After participants had completed the reading comprehension task, they were randomly assigned into one of two conditions: USC or DSC condition. Our manipulation of social comparison was embedded in the feedback provided to participants' regarding their reading comprehension scores. As a manipulation check to ensure that our manipulation was effective, we also asked participants to indicate whether they performed above or below average. Participants then provided self-reports on their performance goal orientation and learning strategy. Lastly, participants completed a demographic survey, including gender and age. Participants were fully debriefed thereafter. All study materials and experimental procedures were administered and communicated in English. Responses on each scale were all averaged for subsequent analyses. All study data are available online at https://osf.io/kdnyt/.

3.1.2.1 FoLO We used the same 4-item FoLO scale (Wee et al., 2022) employed in Study 1.

3.1.2.2 Achievement goal orientation We used the same Goal Orientation Scale (Midgley et al., 1998) employed in Study 1.

3.1.2.3 Learning strategy Learning strategy was measured by the Approaches and Study Skills Inventory for Students (ASSIST; Tait & Entwistle 1996; Tyler & Entwistle, 2013). The surface approach to learning included factors such as lack of purpose,

unrelated memorizing, fear of failure and syllabus-boundedness. One item from the lack of purpose factor was omitted as it involved one's feeling of a particular course rather than assessing one's general state: "I'm not really interested in this course, but I have to take it for other reasons". For the deep approach to learning, seeking meaning, relating ideas, use of evidence, interest in ideas and monitoring effectiveness were assessed. The final scale administered consist of 35 items, and participants were told to rate their agreement to the statements on a 5-point scale (*1: Strongly Disagree; 5: Strongly Agree*). Sample items include "I find I have to concentrate on just memorising a good deal of what I have to learn" (surface learning) and "Regularly, I find myself thinking about ideas from lectures when I'm doing other things" (deep learning).

3.1.2.4 Social Comparison First, participants were given information about the reading comprehension task: "The reading comprehension task was taken from a portion of a practice Scholastic Assessment Test (*SAT Suite of Assessments*, n.d.). Next, participants were given feedback about their reading comprehension task according to their conditions. Participants in the USC condition were informed that their score on the reading comprehension test was 60% while the average score of students in their university was 90%. They were further told that on a curve, they were on the 24th percentile. In the DSC condition, participants were informed that their score on the reading comprehension test was 60% while the average score of students in their university was 40%. They were further told that on a curve, their scores were on the 76th percentile. The social comparison manipulation is detailed in the online supplementary materials.

3.2 Results

3.2.1 Preliminary analyses

All variables were normally distributed (skewness < 1.0). In addition, all the scales were highly reliable ($\alpha > 0.80$). As a preliminary analysis, we examined age and gender difference in our main variables, there was a significant age difference in performance-approach goal orientation ($r = -.276$, $p = .002$; $B = -0.12$, $SE = 0.04$, $t(126) = -3.23$, $p = .002$) and surface learning ($r = -.194$, $p = .029$; $B = -0.06$, $SE = 0.03$, $t(126) = -2.22$, $p = .029$). The negative correlation indicated that older participants endorsed more performance-approach goal orientation and surface learning. In addition, there was also a significant gender difference in performance-avoidance goal orientation ($r = .217$, $p = .014$, $M_{female} = 3.17$, $M_{male} = 2.74$, $t(48) = -2.17$, $p = .035$), surface learning ($r = .347$, $p < .001$, $M_{female} = 3.57$, $M_{male} = 3.10$, $t(46) = -3.59$, $p = .001$) and deep learning ($r = -.251$, $p = .004$, $M_{female} = 4.40$, $M_{male} = 4.77$, $t(126) = 2.92$, $p = .004$).

Additionally, as social comparison was manipulated prior to the assessment of performance goal orientation, we conducted two independent-samples *t*-test analysis to ensure that our manipulation did not impact participants' responses on the performance goal orientation scale. The results indicated that our social comparison (1 = USC, 2 = DSC) manipulation did not influence participants' endorsement of performance approach ($M_{USC} = 3.38$, $M_{DSC} = 3.29$, $t(126) = 0.63$, $p = .533$, $d = 0.870$) nor performance-avoidance ($M_{USC} = 3.15$, $M_{DSC} = 2.95$, $t(126) = 1.25$, $p = .213$, $d = 0.892$)

Table 3 Study 2: Means, standard deviations, range, correlation matrix and reliability statistics

	M	SD	Range	1	2	3	4	5	6	7	8
1. Age	22.12	2.08	19–29	-							
2. Gender	1.73	0.44	1–2	**-.46**	-						
3. FoLO	4.58	1.25	1–7	.06	.15	(0.82)					
4. Performance-Approach	3.34	0.87	1–5	**-.28**	.13	**.45**	(0.85)				
5. Performance-Avoidance	3.06	0.89	1–5	-.12	**.22**	**.37**	**.54**	(0.86)			
6. Mastery	3.53	0.79	1–5	.15	**-.30**	.00	.10	.00	(0.87)		
7. Surface Learning	3.45	0.60	1–5	**-.19**	**.35**	**.42**	.10	**.20**	**-.35**	(0.82)	
8. Deep Learning	4.50	0.66	1–5	.10	**-.25**	.05	**.19**	.09	**.61**	**-.20**	(0.88)

Note. Gender is coded as male=1, female=2. The correlation coefficients in column 2 between Gender and all other variables of interest reflect a point biserial correlation coefficient. Cronbach's alphas are presented in parentheses in the diagonal. Significant results are marked in boldface, $p<.05$

goal orientation. Correlations between all key variables are reported in Table 3. All further analyses controlled for age and gender.

3.2.1.1 FoLO and performance goal orientation Hierarchical regression analysis (Table 4) was conducted to test the relationship between FoLO and performance goal orientation. In order to control for gender and age, Step 1 contained age and gender, and Step 2 contained FoLO as predictors. Controlling for age and gender, the association between FoLO and performance-approach goal was significant and positive ($\triangle R^2 = 0.188$, $F(1, 124)=31.73$, $B=0.30$, $SE=0.05$, $t(124)=5.63$, $p<.001$), supporting Hypothesis 1a. Repeating the same process with performance-avoidance goal orientation as the dependent variable, FoLO was also positively related to performance-approach goal orientation ($\triangle R^2 = 0.113$, $F(1, 124)=16.71$, $B=0.24$, $SE=0.06$, $t(124)=4.09$, $p<.001$). Thus, Hypothesis 1b was supported.

3.2.1.2 ***FoLO and Learning Strategy*** Results from the hierarchical linear regression (Table 5), with learning strategies as dependent variable, age and gender as control (Step 1) and FoLO as predictor (Step 2), revealed a significant positive association between FoLO and surface learning ($\triangle R^2 = 0.140$, $F(1, 124)=23.49$, $B=0.18$, $SE=0.04$, $t(124)=4.85$, $p<.001$), confirming Hypothesis 2a. However, the association between FoLO and deep learning was not significant ($\triangle R^2 = 0.007$, $F(1, 124)=0.97$, $B=0.04$, $SE=0.05$, $t(124)=0.98$, $p=.327$), and Hypothesis 2b was not supported.

3.2.1.3 Moderated Mediation Model To test the proposed second stage moderated mediation model, we entered FoLO (predictor), surface learning (outcome), performance-approach goal orientation (mediator), social comparison (moderator), and age and gender (covariate) into Hayes (2017) PROCESS Model 14.

In line with the prediction, FoLO showed a significant positive association with performance-approach goal orientation ($B=0.30$, $SE=0.05$, $p<.001$, CI_{boot} [0.197, 0.411]) (Fig. 2 A). The two-way interaction of performance-approach goal and social comparison on surface learning was also significant ($B=0.25$, $SE=0.11$, $p=.026$, 95% CI_{boot} [0.030, 0.471]). Specifically, performance-approach goal and surface learning were negatively associated under USC ($B = -0.19$, $SE=0.08$, $p=.018$, 95% CI_{boot} [-0.349, −0.033]) while this relationship was not significant under DSC

Table 4 Study 2: Regression Coefficients for Performance Goal Orientations

	Performance-Approach Goal				Performance-Avoidance Goal			
	Step 1		Step 2		Step 1		Step 2	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Covariates								
Age	**-0.12 (0.04)**	**-0.276**	**-0.12 (0.04)**	**-0.279**	-0.01 (0.04)	-0.019	-0.01 (0.04)	-0.022
Gender	0.00 (0.19)	0.002	-0.13 (0.17)	-0.063	**0.42 (0.20)**	**0.208**	0.31 (0.19)	0.156
Predictor								
FoLO	—	—	**0.30 (0.05)**	**0.439**	—	—	**0.24 (0.06)**	**0.340**

Note. SE=standard error. SEs are shown in parentheses. Significant results are marked in boldface, $p < .05$

Table 5 Study 2: Regression Coefficients for Learning Strategy

| | Surface Learning | | | | Deep Learning | | | |
| | Step 1 | | Step 2 | | Step 1 | | Step 2 | |
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Covariates								
Age	-0.01 (0.03)	-0.043	-0.01 (0.02)	-0.045	-0.01 (0.03)	-0.027	-0.01 (0.03)	-0.028
Gender	**0.44 (0.13)**	**0.328**	**0.36 (0.12)**	**0.270**	**-0.39 (0.14)**	**-0.264**	**-0.41 (0.15)**	**-0.277**
Predictor								
FoLO	—	—	**0.18 (0.04)**	**0.378**	—	—	0.04 (0.05)	0.086

Note. SE=standard error. SEs are shown in parentheses. Significant results are marked in boldface, $p<.05$

($B=0.06$, $SE=0.09$, $p=.491$, 95% CI$_{\text{boot}}$ [-0.111, 0.231]). See Fig. 3 A for a graphical illustration of this moderation. Therefore, the indirect effect of the mediation model (*FoLO ◊ Performance-approach goal orientation ◊ Surface Learning)* was only significant under USC ($B = $ -0.06, $SE=0.03$, 95% CI$_{\text{boot}}$ [-0.124, -0.002]). The overall moderated mediation model was significant (*Index*$=0.076$, $SE_{\text{boot}} = 0.04$, 95%CI$_{\text{Boot}}$ [0.0001, 0.162]), supporting H3a.

We repeated the same procedure with the mediator of performance-approach goal orientation. FoLO showed a significant positive association with performance-avoidance goal orientation ($B=0.24$, $SE=0.06$, $p<.001$, CI$_{\text{boot}}$ [0.125, 0.360]) (Fig. 2B). Furthermore, the two-way interaction of performance-avoidance goal and social comparison on surface learning was significant ($B=0.26$, $SE=0.11$, $p=.017$, 95% CI$_{\text{boot}}$ [0.047, 0.475]), such that performance-avoidance goal and surface learning were positively associated under DSC ($B=0.17$, $SE=0.08$, $p=.038$, 95% CI$_{\text{boot}}$ [0.009, 0.325]). In contrast, the relationship between performance-avoidance goal and surface learning was in the predicted negative direction but did not reach significance under USC ($B = $ -0.09, $SE=0.08$, $p=.235$, 95% CI$_{\text{boot}}$ [-0.250, 0.062]). See Fig. 3B for a graphical illustration of this moderation. Therefore, the indirect effect of the mediation model (*FoLO - Performance-avoidance goal orientation - Surface Learning)* was only significant under DSC ($B=0.04$, $SE=0.02$, 95% CI$_{\text{boot}}$ [0.002, 0.088]). Overall, the moderated mediation model was significant (*Index*$=0.063$, $SE_{\text{boot}} = 0.03$, 95%CI$_{\text{Boot}}$ [0.003, 0.138]), supporting H3c.

When deep learning was entered as the dependent variable, performance-approach goal orientation (*Index*$=-0.037$, $SE_{\text{boot}} = 0.06$, 95%CI$_{\text{Boot}}$ [-0.156, 0.073]) and performance-approach goal orientation (*Index*$=-0.032$, $SE_{\text{boot}} = 0.04$, 95%CI$_{\text{Boot}}$ [-0.118, 0.047]) showed non-significant moderated mediation effect (Fig. 2 C and 2D). Therefore, Hypothesis 3b and Hypothesis 3d were not supported. In sum, Hypothesis 3 was partially supported for only surface learning, but not deep learning, as the dependent variable.

3.3 Discussion

The results from the Study 2 again supported Hypothesis 1, showing that FoLO is positively associated with performance-avoidance and performance-approach goal orientations. There was partial support for Hypothesis 2. Hypothesis 2a was supported, with FoLO being significantly and positively associated with surface learning. However, the non-significant relationship between FoLO and deep learning failed to support Hypothesis 2b. The results denote that FoLO students showed stronger interest in advancing their performance. In comparison, FoLO does not influence students' interest or motivation in gaining a deep understanding of the content than other students.

However, several alternative explanations should be considered. First, learning strategies were measured through self-report assessments and not by behavioural measures. In comparison to surface learning, the construct of deep learning such as seeking meaning is more abstract and involves more diversified intentions and strategies, which offer a great deal of leeway to self-explanation and justification. When students report their use of deep learning strategy, the frequency and the intensity of
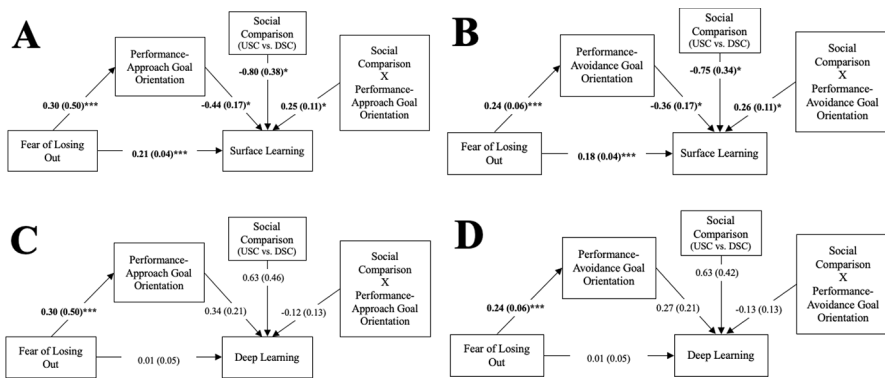
Fig. 2 Statistical model of the hypothesized second-stage moderated mediation (H3). (*Note*. Statistical mediation model with performance-approach goal orientation as the mediator in panel A, performance-avoidance goal orientation as the in panel B. Surface learning was entered as the outcome variable in panel A and B. In panel C, performance-approach goal orientation was entered as the mediator, and performance-avoidance goal orientation was entered as the mediator in panel D. Deep learning was entered as the as the dependent variable in panels C and D. FoLO was entered as the predictor while social comparison (1=USC, 2=DSC) was entered as the moderator on the *b* path of all four models. Social Comparison x Performance Goal Orientation reflects the moderating effect of Social Comparison on the relationship between Performance Goal Orientation and Learning Strategy. All values reflect standardized coefficients and standard errors are presented in the parentheses. *$p<.05$; **$p<.01$; ***$p<.001$)

their use may be under- or over-reported depending on their own definition of deep learning. In addition, since time and resources are limited in real life, the resources used for surface learning is taken away from the potential resources that could have gone for deep learning. Therefore, in the case of FoLO students, their frequent and heavy use of surface learning would denote lesser time available and therefore lower the use of deep learning. Alternatively, university students typically choose their majors and courses with dedication and passion. With our target participants being college students, participants might have reported an endorsement of deep learning regardless of their FoLO tendencies. Future research should further investigate the relationship between FoLO and deep learning by calibrating students' assessment of their endorsement of deep learning strategy.

Lastly, Hypothesis 3 was supported only with surface learning as the dependent variable. Social comparison moderated the relationship between performance goal orientations and surface learning, thereby moderating the indirect effect between FoLO and surface learning via performance goal orientations. Performance-avoidance goal orientation was significantly associated with surface learning only under DSC, and this relationship was not found under USC. Performance-approach goal orientation was related to lower levels of surface learning under USC, but not under DSC. In terms of the whole model, the mediation with performance-approach goal orientation (Fig. 2 A) was only significant under DSC while mediation with performance-approach goal orientation (Fig. 2B) was only significant under USC. The findings support our prediction of the impact of social comparison on improvement motivations, thereby influencing surface learning. In addition, the differing sensitivity of social comparison condition depending on the performance goal orientations
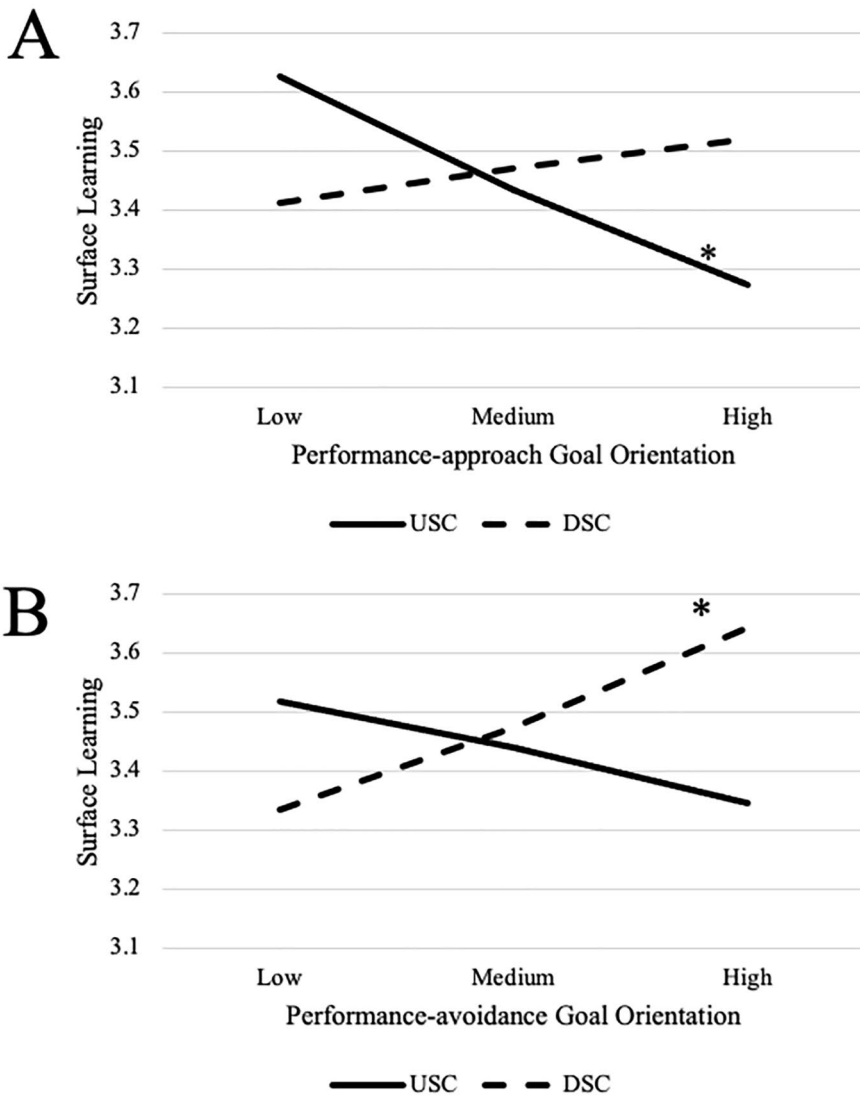
Fig. 3 Interaction Effects of Social Comparison and Performance Goal Orientation on Surface Learning. (*Note*. Interaction between Performance-approach (top panel) and performance-avoidance (bottom panel) Goal Orientations and Social Comparison on Surface Learning. *$p < .05$)

was also confirmed through the current results. In sum, FoLO simultaneously led to both performance-avoidance and -approach goals and was generally associated with higher surface learning when under DSC and lower surface learning strategy when under USC.

When deep learning was examined as the dependent variable, the moderated mediation model was no longer significant. Although FoLO related to performance-avoidance goal orientation significantly, the performance-avoidance goal did not sig-

nificantly relate to deep learning, thereby showing no significant indirect effect. The direct effect between FoLO and deep learning was also non-significant. Therefore, Hypothesis 3a was not supported for deep learning.

4 General discussion

The present paper investigated the influence of FoLO in the academic setting. First, this paper established the link between FoLO and college students' goal orientations. Additionally, the findings shed light on the impact of FoLO on students' achievement goal orientation and depth of learning, contributing towards a better understanding on the influences of FoLO. Particularly, we found that students high on FoLO tend to focus more on the end-results (i.e., performance goal orientations) while there was no difference in their desire for growth and understanding (i.e., mastery goal orientation). FoLO students were also more likely to engage in surface learning, showing higher memorization without relating the content to oneself and only focusing on the required materials in the syllabus. Furthermore, the moderated mediation model demonstrated that FoLO was associated with higher performance-approach and -avoidance goal orientations. These performance goal orientations, in turn, were related to higher surface learning under DSC and lower surface learning under USC.

There are several theoretical contributions of the paper. First, the present paper extends the understudied literature of FoLO by examining its impact on learning. It sheds light on the motivations and behaviours of FoLO students. Although existing literatures have revealed various important outcomes of FoLO, the current research enhances the understanding of FoLO through discovering the potential underlying motivational and behavioural factors: achievement goal orientation and learning strategy. Motivation shapes, drives, and maintains individuals' actions. Understanding the motive behind actions is paramount in explaining and changing one's course of action. With the current findings revealing the underlying motive of performance goal orientations in the influence of FoLO on surface learning, the findings imply that FoLO students' learning goals significantly differ from their counterparts, thereby shaping their learning strategies and very likely influencing their learning outcomes.

The moderation of social comparison on the relationship between performance goal orientations and learning strategy adds new insight in the field of achievement goal orientation. The present results imply that individuals have different levels of sensitivity towards social comparison depending on their performance goal orientations. Particularly, performance-approach goal orientation was more sensitive to USC while performance-avoidance goal orientation was more sensitive to DSC. In addition, the moderation of social comparison extended to the relationship between FoLO and learning strategy via the moderation on the indirect effect of the mediation, with performance goal orientation as the mediator. FoLO was related to higher surface learning when comparing oneself to someone who is worse off while it was related to lower surface learning when comparing oneself to someone who is better. Therefore, the current results indicate the importance of performance goal orientations and social comparison in influencing FoLO individuals' behaviour.

Additionally, majority of the achievement goal orientation literature endorses a variable-centred approach, in which the impact of a single goal orientation is examined. However, Linnenbrink-Garcia et al. (2012) acknowledged that the co-variance of the goal orientations differs across studies and highlighted the possibility of different patterns in the endorsement of multiple goals depending on students' characteristics. Therefore they emphasized the need for a person-centred approach: identifying the different goal profiles according to the characteristics of students (Linnenbrink-Garcia et al., 2012). In line with this suggestion, the current study sheds light on the goal profile for students with FoLO characteristic. Specifically, the current findings suggest that students high in FoLO tend to simultaneously endorse performance-avoidance and -approach goal orientations, thereby influencing other learning behaviours such as depth of learning.

Practically, the paper can provide meaningful insights in learning. The results highlight the negative influence of FoLO on student's learning. As aforementioned, surface learning involves memorizing information without understanding, resulting in fragmentation in knowledge and inability to apply the knowledge in a practical setting. Therefore, higher surface learning that FoLO students engage in is not useful nor adaptive in the long-term. Although the findings do not reveal a significant relationship between FoLO and deep learning, in a real-life situation, FoLO may have an indirect impact on deep learning. As time and resources are limited, the endorsement of surface learning could hinder the use of deep learning. For instance, if one spends a day using a surface learning strategy when studying, one will not have the time and resources to use as much deep learning at this period of time. Therefore, the findings imply that the FoLO mindset may not be adaptive for students.

Although the present study focused on university students, the results may generalize to younger students as well. Singaporean students are exposed to FoLO behaviours and attitudes early on in their childhood through their parents and peers. Parents pressure their children to keep up with their peers, and the rigid education system reinforces the FoLO mindset with extreme competition and meritocratic values (Chuah, 2013). Therefore, it is very likely that younger students, even as young as primary school students, would endorse FoLO mindsets and display individual differences in their FoLO. In fact, Singaporean parents' FoLO starts from enrolling their children to kindergarten, with high appeal for kindergartens run by the Ministry of Education (Mokhtar, 2017). Therefore, future empirical investigations on FoLO mindset in younger students are needed.

Beyond Singaporean students, the current results may apply to other East Asian students as well. Generally, the educational system in East Asian countries is similarly influenced by Confucian teaching from ancient China. For instance, East Asian countries that are influenced by the Confucian teaching (e.g., Japan, Korea, China, Hong Kong, Taiwan, Singapore and Vietnam) tend to have strong policies and supervision in the educational agendas (Marginson, 2011). Also, these countries are characterized by a "one chance" national examination, in which students are tested on their overall learning with an examination at the end of schooling (Marginson, 2011). Perhaps due to the similarities in educational systems, East Asian students tend to show similar types of motivation and behaviours in academic settings. For example,

East Asian students have consistently shown high academic performance and low intellectual interest (Leung, 2002; Yee, 1989).

With East Asians typically experiencing high pressure and competition from a young age (Yee, 1989), the East Asian environment seems to push students towards constant concern and stress over performing as well as others, or FoLO. This FoLO mindset can be reflected by a study showing that more than 40% of the 200,000 Chinese parents felt that additional tutoring is necessary for their children due to the intense competition (Zuo, 2019). Explaining this necessity in tuition for Chinese students, researchers added that this phenomenon demonstrates a wide-spread anxiety over securing a place at top schools (Zuo, 2019). In sum, given the similarities in the extreme competition and high concern over keeping up in East Asian countries, the current research of FoLO may have important implications for East Asian students generally.

4.1 Limitations and future directions

A limitation of the current research is a lack of direct evidence for the causal inferences about the mediation relationship. Study 1 was a correlational study, and Study 2 only manipulated the moderator of social comparison. While the findings are promising and major hypotheses were replicated in both studies, future research could adopt more experimental designs to establish this causal link. Specifically, a causal chain experimental design—one study manipulating FoLO mindset to examine its effect on performance-goal orientation and a second study manipulating performance-goal orientation to examine its impact on learning strategies—will make insightful contributions of the causality (Spencer et al., 2005).

In addition, future research can investigate the antecedents and malleability of FoLO mindset. Whereas prior research demonstrated that FoLO mindset can be activated by exposure to Kiasu icons (Cheng & Hong, 2017), little is known about the development and change of FoLO mindset. Future research could attempt to manipulate FoLO via a fixed-pie vs. expandable pie mindset—the belief that resources are expandable and not fixed (Leslie et al., 2019)—to alleviate individual's FoLO concerns over limited resources. Alternatively, research on the development and malleability of FoLO mindset may help shed light on potential intervention plans that can attenuate negative outcomes associated with a FoLO mindset. Interventions may include changes to parenting strategies, education goals and strategies, and personal perspectives that may reduce FoLO mindset to positively impact students' learning and performance.

Adding on, although the current study examined Singaporean students, the highlighted influences of FoLO on learning and goal outcomes may not be limited to Singaporeans. Upon investigating the difference between Singaporean and Australian samples, Ho et al. (1998) found that there was no significant difference in their FoLO tendencies. Similarly, Kirby and Ross (2007) also found FoLO characteristics in American college students. Notably, both the Australian and American samples were familiar with FoLO behaviours despite having no prior knowledge about the term, 'Kiasuism' (Ho et al., 1998; Kirby & Ross, 2007). It would be interesting to investigate the presence and influence of FoLO in other cultures as well. Given the

commonalities of the environment and student characteristics in East Asian countries, empirical investigations of FoLO in other parts of East Asia may be highly promising and shed new light on Asian students' learning and performance.

5 Conclusion

In sum, the present paper investigated the role of FoLO amongst students in Singapore's tertiary education. In Study 1, FoLO was positively associated with performance goal orientations both on approach and avoidance orientations. Study 2 tested a more comprehensive model and showed that performance goal orientations mediated the link between FoLO and surface learning strategy, depending on social comparison conditions. Overall, the current research demonstrates the importance of FoLO in influencing students' learning motives and learning strategies. In sum, the findings illustrate that individual differences in FoLO mindset, shaped by Singapore cultural norms and influences, provide significant impact on students' learning process and outcomes.

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