



Achievement motivation in the social context: Implicit and explicit Hope of Success and Fear of Failure predict memory for and liking of successful and unsuccessful peers

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ARTICLE INFO

Article history:

Available online 20 August 2009

Keywords:

Implicit–explicit achievement motive distinction
Hope of success
Fear of failure
Peer-achievement

ABSTRACT

The authors examined relations between implicit and explicit Hope of Success (HS) and Fear of Failure (FF) and memory and liking for successful and unsuccessful peers. Implicit motives were expected to predict memory and explicit motives to predict liking of peers. Results from 106 American and 79 Singaporean students supported the implicit–explicit motive distinction as well as a link between HS and the successful peer and between FF and the unsuccessful peer. In both samples, explicit HS predicts liking while implicit HS predicts memory about the successful peer, and implicit FF predicts memory about the unsuccessful peer. Findings indicate achievement motives affect interest in and reaction towards peers and provide evidence for differential validity of implicit and explicit motives.

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1. Introduction

I'll be your foil, Laertes: in mine ignorance/Your skill shall, like a star I'th' darkest night/Stick fiery off indeed... (Hamlet, Act 5 Scene 2)

I stimulated [Holmes]... by a certain methodical slowness in my mentality... that... served to make his own flame-like intuitions... flash up the more vividly and swiftly (Dr. Watson, from "The Adventure of the Creeping Man", The Casebook of Sherlock Holmes).

Achievement motivation—a recurrent need to improve on one's past performances (McClelland, 1987)—is a widely studied construct that has been related to better performance in various domains. In the laboratory, it has been related to more efficient performance on reaction-time, implicit learning, verbal, and memory and attention tasks (e.g., Halisch & Heckhausen, 1989; Lowell, 1952). In the workplace, greater achievement motivation is related to economic success and managerial ability (e.g., McClelland, 1961; McClelland & Boyatzis, 1982). In the classroom, it has been related to the possession of greater intrinsic motivation and to superior academic performance (e.g., O'Conner, Atkinson, & Horner, 1966).

However, while achievement motivation has generally been related to more efficient, task-oriented performances, research has been silent as to how achievement-motivated people accomplish these superior performances in collaboration or in competition with others. Most organizational and educational settings require individuals to work with others in order to obtain these superior performances; beyond the laboratory, interpersonal interactions are unavoidable and relevant social information could become increasingly important for achievement success. However, the achievement motive has traditionally been conceptualized as an "autistic" motive—in the sense that achievement-motivated people feel most challenged by tasks in which they can have personal control over the outcome; they also show less interpersonal sensitivity while performing an achievement task (Berlew & Williams, 1964; Horowitz, 1961). Hence, little is known about how achievement-motivated individuals make use of social information in service of their achievement goals.

The classroom and the workplace are social places and it seems likely that peers would be important influences on people's achievement beliefs, goals, and behaviors. Relevant peers such as classmates and coworkers are examples of social informants who highlight standards for good work as well as provide strategies for working efficiently. In our opening quotations, Laertes and Dr. Watson are foils which highlight major facets of Shakespeare's Hamlet and Conan Doyle's Holmes, but they also serve to prompt the main characters into action by vicariously providing positive (Laertes) or negative (Watson) role models to which Hamlet and Holmes can compare their future courses of action, obtain feedback

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about their own abilities, as well as discover different strategies with which to achieve success or to avoid failure.

This process of deriving information about one's ability vis-à-vis the performance of others is also known as social comparison (c.f. Wood, 1996). Specifically, a person could either compare herself to a peer who is better-performing (a process also known as upward social comparison) or she could compare herself to a peer who is worse-performing (also known as downward social comparison). Accordingly, Laertes is an upward comparison target for Hamlet while Watson is a downward comparison target for Holmes. More generally, upward social comparison targets are positive role models who represent successful achievement strategies and outcomes whereas downward social comparison targets are negative role models who represent unsuccessful achievement strategies and outcomes.

Previous research has shown that people display consistent individual differences in their motivational and attitudinal biases to positive and negative role models. For instance, Lockwood, Jordan, and Kunda (2002) found that when people adopt a promotion-regulatory focus, that is, when they frame their goals in terms of gains rather than losses, they are more receptive and show greater motivation when exposed to positive role models, and also spontaneously generate more examples of positive role models. Conversely, people who adopt a prevention-regulatory focus, that is, when they frame their goals in terms of losses, pay more attention to and show greater motivation after being exposed to negative role models, and spontaneously generate more examples of negative role models. A plausible reason for these results is that positive role models showcase successful outcomes and goal attempts—essentially gains relative to typical performances—which are congruent with a promotion-regulatory focus, whereas negative role models showcase unsuccessful outcomes and mistakes—essentially losses relative to typical performances—which are congruent with a prevention-regulatory focus.

Following these lines of research, the present study investigates how achievement-motivated people react towards and deal with information about peer achievement. While we do not study upward and downward social comparison directly, we investigate whether individual differences in achievement motivation result in cognitive and attitudinal biases towards positive and negative role models. Specifically, one would expect achievement-motivated people to pay greater attention to peers who are successful if the achievement goal is to obtain a positive achievement standard, because these successful peers are positive role models who embody positive achievement goals. Conversely, achievement-motivated people should pay greater attention to peers who are doing badly if the achievement goal is to avoid a poor achievement outcome, since these unsuccessful peers embody achievement goals that are undesirable.

In motivation research, a related conceptual distinction has been made between achievement motivation that is oriented towards attaining positively-framed goals on one hand—otherwise referred to as Hope of Success (HS)—and achievement motivation that is oriented towards avoiding negatively-framed goals—otherwise referred to as Fear of Failure (FF)—on the other (McClelland, 1987). Whereas a person motivated by HS derives pleasure from mastering a challenging task, a person motivated by FF derives relief from overcoming a similar challenge. HS-motivated people have been found to prefer moderately challenging goals (e.g., DeCharms & Carpenter, 1968), suggesting that they should pay greater attention to peers who personify positive—and motivationally-congruent—achievement outcomes. Conversely, since FF-motivated people are oriented to avoiding negative achievement goals (Atkinson, 1958), one would expect FF-motivated people to pay greater attention to peers who personify unsuccessful—also, motivationally-congruent—achievement outcomes.

Based on the robust finding that self-report and non self-report motive measures seldom correlate strongly with each another, McClelland, Koestner, and Weinberger (1989) argued for the existence of two different systems of motivation. While explicit motives—which are assessed by self-report measures such as the Personality Research Form (Jackson, 1984) and the Achievement Motives Scale (Nygard & Gjesme, 1973)—involve self-conscious goals that individuals ascribe to themselves, implicit motives—which are assessed by indirect measures such as the Picture Story Exercise (Koestner & McClelland, 1992)—represent non-conscious yet persistent needs to obtain emotionally-rewarding experiences. While implicit achievement motive scores relate to task performance and long-term behavioral trends such as entrepreneurial success, explicit achievement motive scores predict short-term and deliberate choice behaviors such as preference for certain socially-normative achievement activities (McClelland et al., 1989; Spangler, 1992).

There is some evidence that the differential validity of implicit and explicit achievement motives also extends to the retention of information about, and emotional reactions to, peers, especially when these peers signify successful or unsuccessful achievement outcomes. For instance, DeCharms, Morrison, Reitman, and McClelland (1955) cited findings that implicit achievement motivation is associated with greater recall of material from stories regarding people in different achievement settings, while explicit achievement motives significantly predicted participants' favorable or unfavorable ratings of a person who was previously described as either "successful" or "unsuccessful" respectively. Brunstein and Hoyer (2002) found that explicit achievement motives predicted participants' decision to continue in a task after they had been given norm-referenced performance feedback (vis-à-vis the performance of others), while implicit achievement motives predicted participants' speeds in a reaction-time task after participants were given self-referenced feedback (vis-à-vis their speeds on previous trials).

Although Brunstein and Hoyer (2002) showed that receiving social-comparative information does not affect the task performance of implicitly achievement-motivated people, previous research suggests that implicit motives orient people's attention towards motivationally-congruent information in the social environment (e.g., Schultheiss & Hale, 2007; Schultheiss et al., 2008). Thus, it is possible that implicit motives direct the attention of achievement-motivated people towards peers who represent motivationally-congruent achievement outcomes, and these attentional biases would translate into selective memory gains. The capacity of directing an individual's attention towards motivationally-congruent stimuli is at the core of implicit motive functioning (c.f. Schultheiss & Brunstein, 2005). Specifically, behaviors and cues that have previously been associated with incentive attainment are more likely to capture the individual's attention, especially in similar achievement contexts. In line with this idea, we propose that achieving and non-achieving peers arouse implicit motives by tapping into vicarious achievement-related consummatory behaviors. Accordingly, selective attention and memory should exist for the peer that represents the achievement outcome that is most congruent with participants' predominant motives; participants who are motivated by HS should display selective memory for the successful peer, while those motivated by FF should display selective memory for the unsuccessful peer.

According to McClelland (1989), explicit motives guide voluntary goal expression, are influenced by, and influence one's achievement-related self-knowledge. Furthermore, explicit motives predict decisional and attitudinal outcomes such as peer ratings and task continuance (Brunstein & Hoyer, 2002; DeCharms et al., 1955) suggesting that explicit motivation should predict participants' achievement-related evaluative judgments. It is likely

that individuals who identify as achievement motivated would self-select for social contexts that are in line with their self-declared motives. Since peers are an important part of the social context, explicit HS and FF should predict preferences for interacting with peers such that HS-motivated people should have greater preferences for interacting with successful peers while FF-motivated people should have greater preferences for interacting with less successful peers. This prediction is based on the assumption that HS and FF motives are channeled into behaviors that correspond with the motivational and regulatory goals of approaching a positive achievement outcome on one hand (HS) and avoiding a negative achievement outcome on the other (FF).

Bearing the above general principles in mind, the following are specific predictions for the present research (Please refer to Fig. 1a for a depiction of the hypothesized relationships):

H1a: Greater explicit HS should predict greater liking of the successful peer; however, *H1b*: explicit HS should not be significantly related to memory about the successful peer, nor to memory or liking of the unsuccessful peer.

H2a: Greater explicit FF should predict greater liking of the unsuccessful peer; however, *H2b*: explicit FF should not be significantly related to memory about the unsuccessful peer, nor to memory or liking of the successful peer.

H3a: Greater implicit HS should predict greater memory about the successful peer however, *H3b*: implicit HS should not be significantly related to liking of the successful peer, nor to memory or liking of the unsuccessful peer.

H4a: Greater implicit FF should predict greater memory about the unsuccessful peer; however, *H4b*: implicit FF should not be significantly related to liking of the unsuccessful peer, nor to memory or liking of the successful peer.

Finally, a secondary objective of this research is to explore the relationship between relevance of information to the achievement domain and memory for such information. Specifically, one would assume that information about a peer that is directly pertinent to the achievement task would be more motivationally relevant, and thus more salient to achievement-motivated individuals. However, it is possible that personal information that is unrelated to the achievement domain but which applies generally to a peer would also be remembered more easily. For instance, while a graduate student may pay greater attention to the research techniques employed by her more proficient mentor, she might also generalize her interest to the mentor's personal life. Hence, a secondary research question, "how does relevance of information to achievement domain moderate memory for successful and unsuccessful peers?" was also investigated.

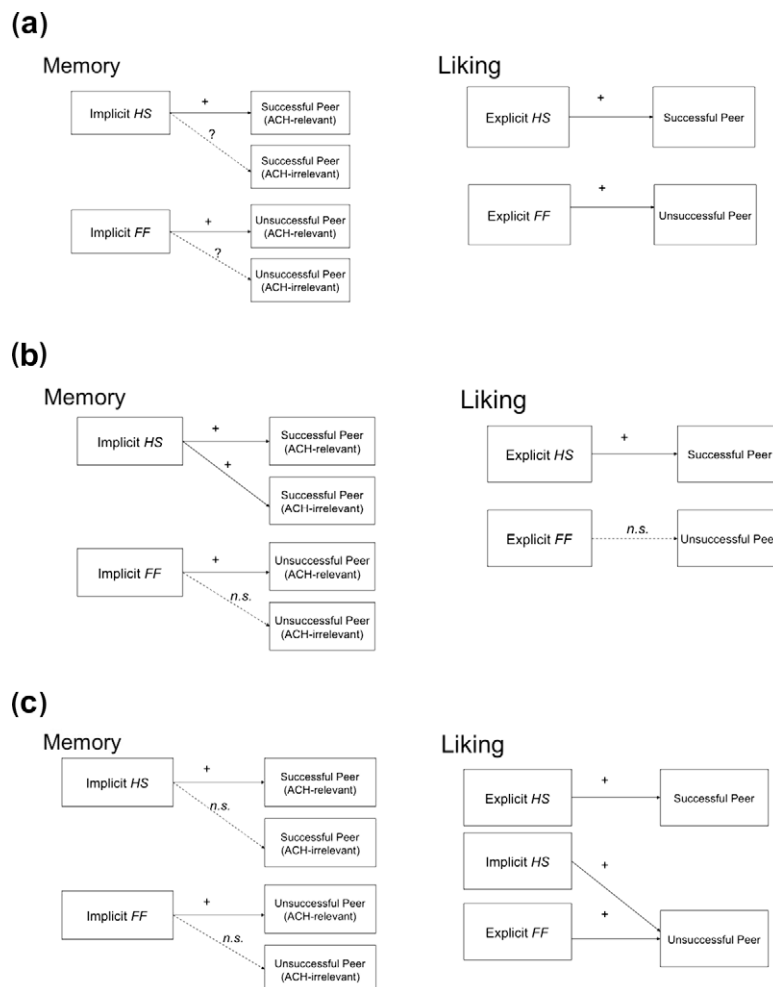


Fig. 1. (a) Hypothesized relationship between implicit and explicit HS and FF on linking of and memory for achievement (ACH)-relevant and -irrelevant information about successful and unsuccessful peers. (b) Study 1 ($n = 106$) summary of results. (c) Study 2 ($n = 79$) summary of results.

2. Study 1 method

2.1. Participants

Sixty-seven female and 39 male students from a public University in the Mid-Western US took part for partial course credit. All participants were traditional college-aged students between 18–22 years. Seventy-eight of the participants were of Caucasian descent, 18 were Asian, four were African-American, three were Hispanic, and three participants did not specify their ethnicity.

2.2. General procedure

Participants were invited to a study called “Psychological Adjustment to College,” and attended two study sessions scheduled exactly 1-week apart. During session 1, they completed measures of implicit and explicit HS and FF. During session 2, participants read a transcript of an interview supposedly conducted on two, first-year students at another University. Participants were led to believe that they were involved in a study investigating successful adjustment to college, and that they would be required to provide a peer evaluation of the interview they had read. After reading the interview transcript, participants answered some questions assessing their liking of and memory for facts about the two interviewees profiled in the transcript. Then, participants completed a suspicion and manipulation check, which included questions about whether the successful and unsuccessful peers were indeed being perceived as such by the participants, as well as a question regarding the believability of the interview. Finally, participants provided some biographical information, and, since the majority (>85%) of the sample was composed of first-year students, indicated their academic performance by providing their High School Grade Point Average.

2.3. Measures

2.3.1. Implicit motives

Implicit HS and FF were assessed using a six-picture Picture Story Exercise (PSE; Koestner & McClelland, 1992) and an English translation (Schultheiss, 2001) of Heckhausen's (1963) scoring manual. During the PSE, participants are shown a battery of pictures depicting a person or persons in motive-relevant settings and given 5 min per picture to write an imaginative story. The resulting protocols are scored for motive imagery according to systematic scoring systems such as Heckhausen's (1963). Of the six pictures used, *bicyclists* is from Wirth, Welsh, and Schultheiss (2006) while *man-at-desk* and *director's door* were used by Heckhausen (1963). Three of the pictures—*chemist*, *hurdlers*, and *gymnast* are pictures that have not been used in previous research but were selected from a set of pictures that were pretested for their ability to arouse achievement imagery (c.f., Pang, in press for pretesting procedures).

In Heckhausen's (1963) scoring system, scorers identify the absence or presence of coding categories under the HS and FF coding sub-systems. An example of a coding subcategory under the HS coding system is *Need for Achievement and Success*, where sentences containing imagery related to any positively-framed achievement goal are coded, while an example of a coding subcategory under the FF coding system is *Instrumental Activity to Avoid Failure*, where sentences containing imagery where a story character is doing or plans to do something to avoid a negative achievement outcome or to dispel the consequences of a failure that has already occurred are coded. For each participant, the sum of imagery occurrences for all HS subcategories across all six protocols represents the total implicit HS score, while the sum of imagery occurrences for all FF subcategories across all six protocols represents the total implicit FF score.

2.3.2. Explicit motives

Explicit HS was measured using the Work Family Orientation Scale (WFOF; Helmreich & Spence, 1978) and explicit FF was measured using the Motive to Avoid Failure Scale (MAF; Hagtvet & Benson, 1997).

The WFOF is a 19-item, five-point likert-type scale (1 = strongly disagree; 5 = strongly agree). A typical item is “If I am not good at something, I would rather keep struggling to master it than move onto something I may be good at.” Cronbach's alpha for the WFOF was .72.

The MAF is a six-item, five-point likert-type scale (1 = strongly disagree; 5 = strongly agree). A typical item is “I am afraid of failing in situations where the outcome is uncertain.” Cronbach's alpha for the MAF was .83.

2.3.3. Interview transcript

The interview transcript was adopted from a similar document used by Aspinwall and Taylor (1993) to study the effect of social comparison on affect regulation and self-evaluation.

In line with our cover story, we defined the achievement domain in this study as academic and social adjustment to college. One of the interviewees was consistently depicted as a student who was doing very well socially and academically and thus represented a positive role model or a successful peer, whereas the other interviewee was consistently depicted as a student who was struggling socially and academically and thus represented a negative role model or an unsuccessful peer.

Information in the interviews was designated successful-relevant, unsuccessful-relevant, successful-irrelevant, unsuccessful-irrelevant, and neutral. Successful- and unsuccessful-relevant information offered details that were directly pertinent to the interviewees' abilities to adjust socially or academically to University life (e.g., regarding grades and establishment of school-based social networks), whereas successful- and unsuccessful-irrelevant information offered details that were unrelated to the interviewees' abilities to adjust to University life (e.g., regarding sports affiliations and hobbies). Finally, neutral information contains details about the interview or campus but which are not personally relevant to either of the interviewees.

Table 1 contains excerpts of the interview and categorizes each piece of information with respect to interviewee (successful/unsuccessful) as well as degree of relevance to the achievement domain (relevant/irrelevant to academic and social adjustment to college).

Previous research has shown that people respond more strongly when role models personify outcomes that are personally relevant, plausible, and attainable (Gentner & Markman, 1997; Smith & Zarate, 1992). Accordingly, care was taken to match the students portrayed in the transcript with participants' characteristics and college experiences. Thus, female participants received transcripts which contained names that suggested the interviewees were female, while male participants received transcripts which contained names that suggested the interviewees were male. Additionally, since most of the participants were in their first or second year at college, the interviewees were represented as first-year students who were attending their second semester at college at the time of the interview. Finally, the students portrayed in the interview were supposedly from a University on the East Coast of the USA that had many similar attributes as their home University in terms of course offerings, reputation, and campus culture.

On average, participants took 5 min to read the transcript.

2.3.4. Liking measure

After participants read the interview transcript, they were asked to complete a set of nine questions about each interviewee that assessed how much the participants liked each interviewee

Table 1
Excerpts of Study 1 interview script (male version) categorized by successful (S) or unsuccessful (U) interviewee and relevance to achievement (ACH) domain.

Excerpt/category	Interviewee			ACH-relevant	
	Neutral	S	U	Yes	No
<i>Interviewer:</i> ...how you are doing academically?					
<i>Adam:</i> ...in high school things came very easy...but once I got here things were different. I should have gotten some help. I really bombed my classes....			●	●	
<i>Ben:</i> I actually had some of the same problems ... I ended...with a study skills class... and a 3.7 GPA		●		●	
<i>Interviewer:</i> ...how about hobbies or sports...					
<i>Ben:</i> I had trouble finding the time to go to the gym, but I made myself go in the morning...I also tried pottery at this center downtown...			●		●
<i>Adam:</i> Well, I tried to go mountain biking...but I didn't have much time ... I tried some yoga instead but didn't like it that much...		●			●
<i>Interviewer:</i> ...speaking of pottery, I heard the Art Department is moving					
<i>Ben:</i> The Art building... is it that tall white building with the ugly sculpture on the roof?	●				
<i>Adam:</i> No it's the one with big windows... it's going to be on the East side of town now...	●				

and their preference for interacting with the interviewees in different settings. The nine items on the liking measure were “Would you like to be roommates with this person?,” “Would you like to be friends with this person?,” “Would you like to have a conversation with this person?,” “Would you like to be acquaintances with this person?,” “Would you like to have this person in your class?,” “Would you like to work with this person in the same group?,” “Would you like to play in the same sports team as this person?,” “Would you like to be paired with this person in a social setting?,” and “Would you like to be paired with this person in an academic setting?” Participants indicated their answers on a five-point scale (1 = not at all; 5 = very much). Cronbach's alpha for the liking measure was .86.

2.3.5. Recognition measure

Next, participants completed a recognition measure for their memory of facts about the interview. They were presented with a list of 30 statements containing facts about the interview along with the following instructions: “We would now like to get an idea of how clear and understandable the interview transcript was. Please answer the following questions regarding the interview as to whether you think they are true or false.” Participants were awarded one-point for each correct answer.

The recognition measure contained 10 questions each about the successful and unsuccessful peer and 10 neutral questions that referred either generally to the campus environment or to something that the interviewer said.

Within the 10 recognition questions for each interviewee, four items contained facts relevant to the achievement domain of academic and social adjustment to college while six items contained incidental biographical facts that were irrelevant to the achievement domain. For each interviewee, participants' scores on the four questions relevant to the achievement domain provided a measure of their recognition memory for achievement-relevant information and their scores on the six questions that were unrelated to social and academic adjustment to college provided a measure of their recognition memory for achievement-irrelevant information.

An example of an item for achievement-relevant information for the male, successful peer, “Ben,” is “Ben got a 3.7 [grade point average] during his first semester,” while an example of an item for achievement-irrelevant information is “Ben is learning how to sail.” An example of a neutral item is “The art building is moving to the East side of town.” Participants' scores on the 10 neutral items provided a baseline measure of their memory capacity.

2.3.6. Manipulation and suspicion checks

After the liking and recognition measures, as a manipulation check, participants were asked to complete a set of six questions on which they rated on a seven-point scale (1 = poorly adjusted;

7 = very well adjusted) how well they thought each of the interviewees were adjusting to college. Examples of items include “How well adjusted do you think Ben is as a student?” and “How likely do you think Ben will thrive in the environment at ...?”

Participants were also asked to compare their own degree of adjustment to college to that of the two interviewees. Two questions assessed the participants' perceptions of their own adjustment to college relative to the successful and unsuccessful interviewees, e.g., “How well do you think you are adjusting to college compared to [successful or unsuccessful peer]?” (1 = much worse; 7 = way better). Since these questions explicitly engaged participants in a social comparative process, participants' answers represent their perceptions of the successful and unsuccessful peers as upward and downward social comparison targets. A participant who rates either—or both—of the interviewees as more well-adjusted than him- or herself would be engaging in upward social comparison, while a participant who rates either—or both—of the interviewees as less well-adjusted than him- or herself would be engaging in downward social comparison.

Finally, as a suspicion check, participants rated the believability of the transcript on a seven-point scale (1 = not believable at all; 7 = extremely believable), and answered an open-ended question “What do you think this study was about?” On average, participants felt the transcript was quite believable with a mean rating of 5.20. Examination of the open-ended question revealed none of the participants suspected the study's rationale or hypotheses.

3. Study 1 results

3.1. Manipulation checks

On average, participants rated the interviewee designated as the successful peer significantly more favorably (Mean = 5.76, SD = 1.02) in his/her degree of adjustment than the interviewee designated as the unsuccessful peer (Mean = 3.66, SD = 1.28), $t(98) = 19.72, p < .001, d = 1.81$. Based on the relative mean ratings of the interviewees, the successful peer was successfully portrayed to our participants as a better-than-average student and the unsuccessful peer as a worse-than-average student. Participants also rated themselves significantly less favorably (Mean = 4.24, SD = 1.27) when they compared themselves to the successful peer, than when they compared themselves with the unsuccessful peer (Mean = 5.57, SD = 1.06), $t(98) = 6.52, p < .001, d = 1.14$. Thus, participants regarded the successful peer as a better-performing other and the unsuccessful peer as a worse-performing other, indicating that the sample in Study 1 tended to view the successful interviewee as an upward social comparison target and the unsuccessful interviewee as a downward social comparison target.

3.2. Implicit motive scores

Two independent coders who had previously obtained over 85% reliability with Heckhausen's (1963) training materials scored all PSE protocols. Inter-rater reliability as estimated using the index of concordance (Winter, 1994) was greater than 90%. Protocol length was marginally correlated with HS, $r(106) = .18, p = .05$, and significantly correlated with FF, $r(106) = .19, p < .05$. Following previous recommendations, we residualized motives scores for the influence of protocol length and converted residuals to z scores (c.f., Schultheiss, Liening, & Schad, 2008; Schultheiss & Pang, 2007). These residualized z scores were used in subsequent Study 1 analyses concerning implicit HS and FF motives.

3.3. Descriptives and intercorrelations between main variables

Table 2 shows the intercorrelations between and means and standard deviations of the main variables. Explicit and implicit motives did not correlate significantly with each other. This finding is consistent with previous literature showing minimal or no correlation (Thrash, Elliot, & Schultheiss, 2007). There was also no significant correlation between implicit HS and FF scores, implying that the two constructs, as defined by their scores on Heckhausen's measure, are distinct concepts. There was a negative correlation between explicit HS and FF, which is consistent with previous research suggesting that questionnaire measures of HS and FF assess related but theoretically opposing concepts (Hagtvet & Zuo, 2000; Lang & Fries, 2006).

3.4. Liking

As predicted, explicit HS was significantly positively correlated with liking for the successful peer such that participants with greater explicit HS were significantly more likely to express greater liking for the successful peer. Contrary to expectations, no significant motive effects were found for liking of the unsuccessful peer.

3.5. Memory

There was an overall memory effect such that greater recognition memory for neutral facts was associated with greater recogni-

tion memory for facts related to both interviewees, and all the recognition-memory scores were positively correlated with each other regardless of whether the memory was for information that was related or unrelated to the achievement domain or whether it referred to the successful or unsuccessful interviewee.

In order to account for the general memory effects that emerged between the recognition-memory scores, four hierarchical regressions were also carried out to determine the effect of implicit and explicit motives on recognition memory for achievement-relevant and achievement-irrelevant information for the successful and unsuccessful interviewees, while controlling for participants' recognition memory for neutral facts. The recognition-memory scores for achievement-relevant and achievement-irrelevant information for the successful and unsuccessful interviewees were entered as dependent variables while recognition-memory scores for neutral information were entered in the first block and implicit HS, explicit HS, implicit FF, and explicit FF were tested in the second block as predictors. The pattern of findings from the regressions did not differ from those suggested by the correlations, thus in the interest of parsimony the regression results will not be presented here.

As shown in Table 2, consistent with expectations, implicit HS was significantly positively correlated with recognition memory for achievement-relevant and achievement-irrelevant information about the successful peer. Additionally, as predicted implicit FF was significantly positively correlated with recognition memory for achievement-relevant information about the unsuccessful peer.

A possible explanation for the memory bias of HS-motivated participants for information about the successful peer on one hand and the memory bias of FF-motivated participants for information about the unsuccessful peer on the other could be that the participants who are motivated by HS are actually performing better academically and socially than the participants who are motivated by FF. Hence, the improved memory HS-motivated individuals have for the successful peers could be due to the fact that successful peers are more similar to the HS-motivated people in their level of performance and are thus more personally relevant and memorable. Following this argument, the FF-motivated people could have remembered more information about the unsuccessful peer because they are poorer students and thus find the unsuccessful

Table 2
Means, standard deviations, and intercorrelations between variables for Study 1 (N = 106).

Variable	M	SD	Variable														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1 Implicit HS	1.78	.75	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 Implicit FF	.56	.44	–.02	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 Explicit HS	3.71	.36	.14	.02	–	–	–	–	–	–	–	–	–	–	–	–	–
4 Explicit FF	2.87	.71	.00	–.09	–.46**	–	–	–	–	–	–	–	–	–	–	–	–
5 LikingS	3.70	.66	.01	–.02	.32**	.01	–	–	–	–	–	–	–	–	–	–	–
6 LikingU	2.97	.66	.03	–.03	–.12	–.04	–.45**	–	–	–	–	–	–	–	–	–	–
7 RecogS	2.69	.85	.53**	.04	.00	.14	.10	–.02	–	–	–	–	–	–	–	–	–
8 RecogU	2.91	1.05	.20*	.34**	.02	.00	.18*	–.12	.53**	–	–	–	–	–	–	–	–
9 RecogIS	3.54	1.13	.26*	–.09	.04	.03	.16*	–.07	.52**	.29**	–	–	–	–	–	–	–
10 RecogIU	3.01	1.42	.17*	.02	–.15	.09	–.06	–.02	.55**	.39**	.47**	–	–	–	–	–	–
11 RecogN	5.66	1.98	.23*	–.03	–.19*	.19*	–.07	.20*	.60**	.29**	.50**	.72**	–	–	–	–	–
12 PpS	4.24	1.27	–.11	.17	.18*	–.25*	–.13	.09	–.22*	–.18*	–.08	–.13	–.13	–	–	–	–
13 PpU	5.57	1.06	–.02	.06	.22*	–.36**	.34**	–.41**	.04	.30**	.03	.14	–.18	–.22*	–	–	–
14 HSGPA	3.85	.45	–.17	.15	.09	.10	.15	.06	–.05	.07	.01	.12	.01	.05	–.07	–	–

Note: Implicit HS = scores on Heckhausen HS system; Implicit FF = scores on Heckhausen FF system; Explicit HS = scores on WOFO scale; Explicit FF = scores on MAF scale; LikingS = liking for successful peer; LikingU = liking for unsuccessful peer; RecogS = recognition memory for achievement-relevant information about the successful peer; RecogU = recognition memory for achievement-relevant information about the unsuccessful peer; RecogIS = recognition memory for achievement-irrelevant information related to the successful peer; RecogIU = recognition memory for achievement-irrelevant information related to the unsuccessful peer; RecogN = recognition memory for neutral information; PpS = participant's perceived relative performance in comparison to successful peer; PpU = participant's perceived relative performance in comparison to unsuccessful peer; HSGPA = High School Grade Point Average.

* $p < .10$.
 * $p < .05$.
 ** $p < .005$.

peer more personally relevant and memorable. In order to test this theory, we included in the bivariate correlation analyses, participants' self-reported High School Grade Point Average (HSGPA; maximum score = 5.0) as well as their perceptions of their own performances relative to the performance of the successful peer (ppS) and their self-perceived performances relative to the performance of the unsuccessful peer (ppU). Participants' perceived performance relative to the successful and unsuccessful peers were indicated by their answers on two questions in the manipulation check, "How well-adjusted academically and socially do you think you are compared to [successful or unsuccessful interviewee]?" (seven-point scale; 1 = much worse, 7 = way better).

As shown in Table 2, HSGPA scores are not significantly correlated with implicit or explicit motives, indicating that HS-motivated people are not better-performing than FF-motivated people. Additionally, HSGPA was not correlated with liking or memory for either interviewee, indicating that the enhanced memory and liking of HS-motivated individuals for the successful peer is not due to the fact that HS-motivated people are themselves better-performing, nor is the enhanced memory and liking of FF-motivated individuals for the unsuccessful peer due to the fact that they are performing badly themselves.

Interestingly, explicit HS scores were significantly or marginally significantly positively correlated with while explicit FF scores were significantly negatively correlated with both ppS and ppU scores. Specifically, the greater a participant's explicit HS motivation, the more likely he or she would rate themselves as performing better than the successful as well as the unsuccessful interviewee. In other words, it seems that HS-motivated individuals view both the successful and unsuccessful peers as downward social comparison targets. Conversely, the greater a participant's explicit FF motivation, the more likely he or she would rate themselves as performing worse than the successful and unsuccessful interviewees. In other words, it seems that FF-motivated individuals tend to view both the successful and the unsuccessful peers as upward social comparison targets. These findings indicate that self-attributed achievement motives may also affect self-efficacy, especially when individuals are using peers' performances as anchorpoints for evaluating their own achievements.

Participants' ppU scores were also significantly positively correlated with liking for the successful peer and negatively correlated with liking of the unsuccessful peer. The more favorably participants perceived their performance relative to that of the interviewee depicted as unsuccessful, the more likely participants would express liking of the successful peer and dislike of the unsuccessful peer.

Finally, recognition memory for information related to the successful peer and relevant to the achievement domain was significantly negatively related to ppS, while recognition memory for achievement-relevant information related to the unsuccessful peer was significantly positively related to ppU. These findings indicate that the more achievement oriented information participants remembered about the interviewee designated as successful, the less likely they were to rate themselves favorably compared to this peer. Similarly, the more participants remembered about the interviewee designated as unsuccessful, the more likely they were to rate themselves favorably compared to this peer. These results suggest that self-evaluations of performance are affected by accessibility of information about peers in the achievement context who are examples of positive or negative role models.

4. Study 1 discussion

Fig. 1b summarizes Study 1's results. Hypotheses 1, 3, and 4 were supported; explicit HS was associated with greater liking of

while implicit HS was associated with greater memory for the successful interviewee, and implicit FF was associated with greater memory for achievement-relevant information about the unsuccessful interviewee. As expected, explicit HS was unrelated to liking of the unsuccessful interviewee, nor to memory about either interviewee. Additionally, implicit FF was not related to memory about the successful interviewee, and neither implicit HS nor implicit FF was related to liking of either interviewee. However, contrary to expectations, explicit FF was not related to liking of the unsuccessful interviewee.

Generally, the findings show support for the idea that implicit and explicit motives predict different ways of responding to peer achievement as well as partial support for the idea that HS-motivated people show memory and attitudinal biases for successful peers while FF-motivated people show memory and attitudinal biases for unsuccessful peers. Specifically, participants with higher scores on implicit and explicit HS remember more facts about and expressed significantly greater liking for the successful peer while participants with higher scores on implicit FF remembered more facts about the unsuccessful peer. Additionally, relevance moderates the effect of FF on memory about the unsuccessful peer—those motivated by FF remember more about the unsuccessful peer only if the information is relevant to the achievement domain of academic and social adjustment to college.

The finding that explicit motives predict participants' self-evaluations of their performance relative to the performance of the unsuccessful and successful peers corroborates previous research that explicit achievement motives are influenced by social comparative and norm-referenced feedback (Brunstein & Hoyer, 2002; DeCharms et al., 1955). More importantly, it suggests that elements of self-knowledge such as self-declared motives to achieve also affect other parts of one's achievement-related self-concept such as self-efficacy; future studies could include actual measures of self-efficacy in order to confirm this association between explicit achievement motives and self-evaluations of ability (albeit ability that is evaluated vis-à-vis relevant others in the achievement context).

5. Study 2 introduction

In Study 2, we sought to replicate the findings of Study 1 in a different culture, as well as to clarify the findings regarding the unsuccessful peer by using a subtler and more realistic manipulation procedure. Additionally, we investigate whether free-recall memory is influenced by implicit motives in the same way that recognition memory is.

5.1. Cultural considerations

Study 2 seeks to replicate the results of Study 1 using participants from a large, public University in Singapore. The University in Study 2 is similar to the University in Study 1 in some aspects: both are large, research-based public institutions with extensive undergraduate and graduate curriculums that are taught in English. However, the student population in Study 2 is very different from that of Study 1, particularly in terms of its demographic and cultural characteristics.

Singapore provides an interesting counterpoint to both American and Chinese populations, because although she is cosmopolitan and heavily exposed to westernized media influences, her largest ethnic group is Chinese. Despite their bilingual background and westernized socialization experiences, Singaporean Chinese still hold onto traditional Chinese values and beliefs (c.f., Chang, Wong, & Teo, 2000). Thus, comparison between the American and Singapore samples could provide a useful illustration of the

robustness of the findings in Study 1, as well as reveal meaningful cultural differences in the relationship between achievement motivation and reactions to relevant peers in the achievement context.

5.2. Interview recording

In Study 1, results showed little relationship between motives and liking for the unsuccessful peer. One possible explanation for these null results could be that negative role models tend to be socially undesirable and people are more likely to possess self-consciousness about explicitly associating themselves with the unsuccessful interviewee. It is possible that the manipulation in Study 1 was too “obvious,” that the successful and unsuccessful peers were being presented in such stark relief that participants defined the unsuccessful peer too explicitly as such. Although Study 1’s manipulation checks revealed that participants rated the interview transcript as believable, the too-obvious depiction of the unsuccessful peer may have yielded distorted results. Thus, in Study 2 we sought to create a more realistic manipulation technique by introducing audio recordings of the interviews, complete with background noise and verbal hesitations.

5.3. Free-recall memory measure

In Study 1, recognition of facts was used as a measure of participants’ memory. However, the retrieval processes in recognition tests are very different from retrieval processes used in recall tasks, which are more typical of the type of memory that people access in everyday social interactions. In recognition tasks, contextual associations contained in questions can facilitate retrieval, whereas in most social situations, these retrieval cues are not conveniently available. Thus, in Study 2, we included a free-recall memory measure to discover if a more natural and unstructured retrieval process would generate different results.

6. Study 2 method

6.1. Participants

Seventy female and 30 male students from a Singapore University participated for partial course credit. All participants were traditional college-aged students between 18–22 years. Seventy-three participants were Chinese, seven were Malay, and 20 did not specify their ethnicity.

6.2. General procedure

The procedure for Study 2 was identical to that of Study 1, with two exceptions: (a) Study 2 was conducted in a single experiment session, and (b) an audio recording of the interview was presented to participants together with the written transcript. First, participants completed measures of implicit and explicit HS and FF. Next, they listened to an audio recording of an interview that was supposedly conducted on two first-year students from another Singaporean University. Then, participants completed a series of questions to assess their liking for and their recall and recognition memory of the interviewees. In order to prevent the questions on the recognition measure from priming material on the free-recall task, the free-recall measure was always administered before the recognition measure. Finally, participants provided their biographical information, their High School GPA (maximum = 4.00), and completed the manipulation and suspicion checks.

6.3. Measures

6.3.1. Implicit motives

Implicit HS and FF were assessed using a four-picture PSE and an English translation (Schultheiss, 2001) of Heckhausen’s (1963) scoring manual. Picture cues were selected from a set of pictures that had been pretested for their ability to arouse achievement imagery in the Singapore sample. Of the four pictures used, two pictures, *chemist* and *gymnast* were also used in Study 1. The two other pictures used in Study 2 were *footballer* from Schultheiss and Rohde (2002), and *pianist* (Pang, 2006), as these pictures produced greater average achievement motive imagery in pretest protocols compared to the other four pictures (*bicyclists*, *man-at-desk*, *director’s door*, and *hurdlers*) that were used in Study 1.

6.3.2. Explicit motives

Following Study 1, explicit HS was measured using the WOFO and explicit FF was measured using the MAF. Cronbach’s alpha was .73 for the WOFO and .79 for the MAF.

6.3.3. Singaporean interview recording

The interview in Study 2 was identical to that used in Study 1, with two exceptions: (a) it was modified to fit the Singaporean context, and (b) participants listened to an audio recording of the interview while they followed along with the written transcript in front of them. In order to relate the interview used in Study 1 to the Singaporean context, names of people and places were changed to Singaporean ones. To further increase the realism of the audio recording, some verbal hesitations (e.g., “ah...”, “um...”) and common Singaporean colloquialisms were also added. Finally, the undergraduates in the interview were portrayed as students from another University in Singapore that had similar attributes as the participants’ home University in terms of size, reputation, and curriculum. Female participants listened to a recording where both interviewees and the interviewer were female, while male participants listened to a recording where both interviewees and the interviewer were male. On average, participants took 7 min to read the transcript, which was also the length of the recording.

6.3.4. Liking measure

After participants listened to the interview recording, they were asked to complete the same set of liking questions that were given to participants in Study 1. Cronbach’s alpha for the liking measure was .80.

6.3.5. Free-recall measure

Participants were asked to freely recall what they remembered from the interview (“Please write down all you can remember about the interview you have just read”) and were allowed to write until they indicated that they had exhausted their memory. On average, participants wrote for 7 min. One of the study authors (YSC) then coded all the answers for number of accurately-recalled facts about each interviewee. Since participants’ free-recall of facts about the interview was relatively limited, no distinctions were made between facts that were relevant to the achievement domain and facts that were irrelevant to achievement. Three aggregated scores for free-recall memory resulted: the sum of all accurately-recalled facts about the successful interviewee; the sum of all accurately-recalled facts about the unsuccessful interviewee; and the sum of all accurately-recalled facts about the interview that were neutral and unrelated to either interviewee.

6.3.6. Recognition measure

The recognition measure was identical to that used in Study 1, with questions changed to match the interviewees depicted in the Singapore interview script. Thus, each participant had five rec-

ognition-memory scores for: neutral information, achievement-relevant information about the successful peer, achievement-irrelevant information about the successful peer, achievement-relevant information about the unsuccessful peer, and achievement-irrelevant information about the unsuccessful peer.

6.3.7. Manipulation and suspicion checks

Finally, after the questions on liking, recall, and recognition memory, participants completed the same set of manipulation and suspicion checks as Study 1. On average, participants rated the interview as believable on a scale of 5.03 out of 7. The data of 11 subjects were excluded from further analyses because two subjects openly questioned the believability of the transcript while nine had missing data. The final sample after exclusion of these 11 subjects included 57 females and 22 males.

7. Study 2 results

7.1. Manipulation checks

As in Study 1, Study 2 participants gave significantly lower adjustment/achievement ratings for the unsuccessful interviewee (Mean = 2.55, SD = .80) than for the successful interviewee (Mean = 6.46, SD = .49), $t(78) = 10.57, p < .001, d = 5.89$. The larger discrepancy between mean adjustment ratings for the successful versus the unsuccessful peer, compared to those in the manipulation check for Study 1, indicate that the manipulation for Study 2 was more effective at presenting the impression of the successful interviewee as a better-than-average student and the unsuccessful interviewee as a worse-than-average student. Additionally, participants rated themselves significantly more favorably when they compared their own performances to that of the unsuccessful peer ($M = 4.94, SD = 1.17$) than when they compared themselves to the successful peer ($M = 4.00, SD = 1.33$), $t(78) = 9.26, p < .001, d = .75$.

7.2. Descriptives and intercorrelations between main variables

Table 3 shows the intercorrelations between and means and standard deviations of the main variables. Implicit HS and FF were moderately negatively correlated, as were explicit HS and FF. These findings are consistent with past research (Spangler, 1992; Thrash et al., 2007). Interestingly, implicit and explicit HS were negatively correlated, albeit only marginally so.

7.3. Liking

As predicted, participants with greater explicit HS expressed significantly greater liking for the successful peer and participants with greater explicit FF expressed greater liking for the unsuccessful peer. Additionally, participants with greater implicit HS also expressed significantly greater liking for the unsuccessful peer.

7.4. Recognition memory

The general memory effects in Study 1 did not show up in Study 2. While in Study 1, recognition-memory scores were inter-correlated with one another across the board, in Study 2 the only significant correlations that emerged between the memory variables were positive correlations between neutral recognition memory and achievement-relevant recognition memory for the unsuccessful peer and between achievement-irrelevant memory scores for the successful and unsuccessful peers, as well as a negative correlation between recognition memory for achievement-relevant information and recognition memory for achievement-irrelevant information about the successful peer.

As predicted, implicit HS was associated with greater recognition memory for achievement-relevant information about the successful interviewee while implicit FF was associated with greater recognition memory for achievement-relevant information about the unsuccessful interviewee. There were no statistically significant motive effects on recognition memory for achievement-irrel-

Table 3
Means, standard deviations, and intercorrelations between variables for Study 2 ($N = 79$).

Variable	M	SD	Variable																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17							
1 Implicit HS	1.81	.68	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
2 Implicit FF	.77	.45	–.27 [†]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 Explicit HS	3.43	.36	–.20 [†]	.15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4 Explicit FF	.28	.66	.18	–.03	–.28 [†]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5 LikingS	3.62	.78	–.04	.12	.72 ^{**}	–.09	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 LikingU	2.84	.53	.36 ^{**}	.00	–.11	.38 ^{**}	.18	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7 RecogS	2.00	.80	.74 ^{**}	–.08	–.21 [†]	.12	.08	.27 [†]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8 RecogU	2.62	1.29	–.06	.69 ^{**}	.14	–.08	.18	.09	.10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9 RecogIS	4.57	.77	–.14	–.07	.05	–.12	.08	–.04	–.24 [†]	–.12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10 RecogIU	4.27	.80	–.11	–.03	–.21 [†]	.02	–.13	.06	–.06	–.08	.23 [†]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11 RecogN	6.46	1.04	–.01	–.08	.00	.03	.09	–.09	.16	.30 ^{**}	–.20 [†]	.21 [†]	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12 RecallS	2.98	2.49	.84 ^{**}	–.22 [†]	–.19 [†]	.11	–.06	.22 ^{**}	.59 ^{**}	–.02	–.10	–.09	–.04	–	–	–	–	–	–	–	–	–	–	–	–	–
13 RecallU	2.84	1.36	–.14	–.01	–.15	.03	–.10	–.08	–.14	.03	–.09	–.09	–.05	–.02	–	–	–	–	–	–	–	–	–	–	–	–
14 RecallN	.74	1.08	.28 [†]	–.27 [†]	–.22 [†]	.16	.16	.11	.23 [†]	–.23 [†]	.00	–.05	.15	.37 ^{**}	–.24 [†]	–	–	–	–	–	–	–	–	–	–	–
15 PpS	4.00	1.33	–.22 [†]	.17	.23 [†]	–.36 ^{**}	.16	–.03	–.20 [†]	–.21 [†]	–.01	.00	.14	.13	–.05	–.17	–	–	–	–	–	–	–	–	–	–
16 PpU	4.94	1.17	–.19 [†]	.17	.20 [†]	–.28 [†]	.23 [†]	–.19 [†]	–.09	.23 [†]	–.15	–.11	.00	–.17	–.08	.15	–.40 ^{**}	–	–	–	–	–	–	–	–	–
17 HSGPA	2.76	.61	–.14	–.12	–.09	–.12	–.03	.03	–.05	.03	.10	.24 [†]	–.15	.04	.13	–.06	.02	.05	–	–	–	–	–	–	–	–

Note: Implicit HS = scores on Heckhausen HS system; Implicit FF = scores on Heckhausen FF system; Explicit HS = scores on WOFO scale; Explicit FF = scores on MAF scale; LikingS = Liking for successful peer; LikingU = Liking for unsuccessful peer; RecogS = recognition memory for achievement-relevant information about the successful peer; RecogU = recognition memory for achievement-relevant information about the unsuccessful peer; RecogIS = recognition memory for achievement-irrelevant information related to the successful peer; RecogIU = recognition memory for achievement-irrelevant information related to the unsuccessful peer; RecogN = recognition memory for neutral information; RecallS = recall memory about the successful peer; RecallU = recall memory about the unsuccessful peer; RecallN = recall of neutral information; PpS = participant's perceived relative performance in comparison to successful peer; PpU = participant's perceived relative performance in comparison to unsuccessful peer; HSGPA = High School Grade Point Average.

[†] $p < .10$.

^{*} $p < .05$.

^{**} $p < .005$.

evant information about either interviewee. Hence, implicit HS and FF are associated with greater recognition memory about the successful and unsuccessful peers only when the information is relevant to the achievement domain.

7.5. Recall memory

As predicted, implicit HS was associated with greater recall memory about the successful peer, but contrary to predictions there were no significant motive effects for recall memory for the unsuccessful peer.

There were some interesting relationships between memory for information about the successful peer and liking of the unsuccessful peer. Specifically, recall memory and recognition-memory scores for achievement-relevant information about the successful peer were significantly positively correlated with liking of the unsuccessful peer, suggesting that participants in Study 2 expressed greater liking for the unsuccessful peer if they remembered more information about the successful peer.

In order to study whether HS- and FF-motivated participants' memory biases and liking preferences were influenced by their actual or perceived performances relative to the successful and unsuccessful interviewees, we also included in the bivariate correlation analyses, participants' self-reported HSGPAs as well as their self-perceived performances relative to the successful (ppS) and unsuccessful (ppU) interviewees.

Participants' HSGPA scores were not significantly correlated with implicit or explicit motives, nor with liking of or memory about either interviewee, indicating that the enhanced liking and memory of HS- and FF-motivated participants for the successful and unsuccessful peers was not affected by participants' actual achievements.

Consistent with the findings in Study 1, Study 2 participants' explicit HS scores were significantly or marginally significantly positively correlated with ppS and ppU scores, while participants' explicit FF were significantly negatively correlated with ppS and ppU scores. Hence, the greater participants' self-attributed HS motivation was, the more favorably they perceived their own performances relative to the performances of both the successful and unsuccessful interviewees, while the greater participants' self-attributed FF motivation, the less favorably they perceived their own performances relative to the performances of both interviewees. Similar to the participants in Study 1, participants in Study 2 who were explicitly HS-motivated viewed both the successful and unsuccessful interviewees as downward social comparison targets whereas participants who were explicitly motivated by FF viewed both interviewees as upward social comparison targets.

Participants' ppU scores were also significantly correlated with liking of the successful peer and with recognition memory for achievement-relevant information related to the unsuccessful peer. These findings indicate that the more participants remembered about the interviewee designated as unsuccessful, the more likely they were to rate themselves favorably compared to the unsuccessful interviewee and the greater their self-reported liking of the successful interviewee would be.

8. Study 2 discussion

Fig. 1c summarizes Study 2's results. Hypotheses 1, 2, and 4 were supported. Explicit HS was associated with greater liking for the successful peer, but was unrelated to liking for the unsuccessful peer or to recognition or recall memory for either peer. Explicit FF was associated with greater liking for the unsuccessful peer, but was unrelated to liking for the successful peer or to memory for either peer. Finally, implicit FF was associated with greater

recognition memory for achievement-relevant information about the unsuccessful peer but was unrelated to memory about the successful peer or to liking of either peer. Hypothesis 3 was partially supported: implicit HS was associated with greater recognition and recall about the successful peer and was unrelated to memory about the unsuccessful peer. However, contrary to expectations, implicit HS was associated with greater liking for the unsuccessful peer.

Following Study 1, implicit FF is related to greater memory about the unsuccessful peer only if the information is relevant to the achievement domain. However, Study 1's finding that implicit HS predicts greater recognition memory for achievement-irrelevant information about the successful peer was not replicated in Study 2. Taken together, these results indicate that relevance of information to the achievement domain moderates the relationship between motives and memory, such that relevance increases the likelihood that information is remembered. This suggests that achievement-motivated people selectively pay attention to their peers in order to gain strategic advantage, by focusing on information that peers provide about performing better.

The general memory effects observed in Study 1 did not surface in Study 2. Specifically, recognition-memory scores for achievement-irrelevant and relevant information about both interviewees were positively correlated with each other as well as with neutral recognition memory in Study 1 but not in Study 2. One reason that fewer correlations appeared between recognition-memory scores in Study 2 could be because of the more subtle manipulation utilized audio as well as visual cues to present information about the interviewees. Additionally, Study 1 participants were allowed to set their own pace for reading the interview transcript, and were able to revisit material in the transcript at any time in the experiment, which may have increased their ability to make associations throughout the transcript between pieces of information pertaining to each interviewee. Whereas Study 2 participants were only given one opportunity to listen to the interview recording, at a pace preset by the experimenter, and the transcript was retrieved by the experimenter at the end of the recording. It is possible that the less straightforward presentation of the interview material in Study 2 made retrieval of information more difficult for participants, and also made associative retrieval of information across categories (successful/successful, relevant and irrelevant to achievement) less likely.

As was observed in Study 1, participants in Study 2 who received higher scores in explicit HS were more likely to view both the successful and the unsuccessful interviewees as worse-performing peers while those who received higher scores in explicit FF were more likely to view both interviewees as better-performing peers. It seems that explicit achievement motives affect students' perceptions of their own abilities relative to those of their peers.

8.1. General discussion

Results in both studies suggest that explicit and implicit motives possess different predictive validity; explicit HS was related to greater liking while implicit HS to better memory for achievement-related information about the successful peer, and implicit FF was related to better recognition memory for the unsuccessful peer. Additionally, explicit FF was related to greater liking for the unsuccessful peer in Study 2. Implicit motives seem to predict implicit preferences such as memory about role models, whereas explicit motives predict explicit preferences such as consciously constructed attitudes for associating with these role models. These findings corroborate previous research that implicit and explicit achievement motives are distinct but related constructs with different predictive validity (Thrash et al., 2007).

Findings in both studies suggest a link between HS and the successful peer. However, results are less straightforward for the unsuccessful peer, as implicit FF was associated with recognition memory but not with recall memory in Study 2. Furthermore, liking of the unsuccessful peer was uncorrelated with explicit FF in Study 1, but correlated with implicit HS and explicit FF in Study 2. The complicated picture that emerges for participants' liking and memory for the unsuccessful peer is intriguing.

One possible explanation is that participants may not necessarily have provided accurate ratings of their liking because it is generally neither socially desirable nor emotionally rewarding to identify with an unsuccessful peer (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990). A second, related explanation is that liking for the unsuccessful peer is confounded with other constructs that are affected by socially-desirable attitudes such as self-monitoring which, in turn, moderate the relationship with self-attributed achievement motives (c.f., Covington, 2000; Thrash et al., 2007). Future studies could include variables such as self-monitoring to investigate links between motives, the self, and preference for unsuccessful peers, as well as assess emotional arousal to determine if unsuccessful peers are indeed so emotionally arousing as to interfere with participants' veridical reporting.

A third explanation could be differences in sample characteristics, specifically, cross-cultural differences in beliefs about achievement. Social contexts provide important information about achievement and ways of learning (Dweck & Leggett, 1988; Frey & Ruble, 1985). By extension, culturally held values about competence and learning affect people's reactions to peer achievement. For instance, while individualism is strongly stressed in American culture, Chinese are socialized to value interdependence and are more impressed with performances that are evaluated on a collective level than with personal accomplishments (Yu, 1980). Previous research has also shown that White Americans tend to attribute their successes to ability and their failures to a lack of effort (e.g., Weiner, 1986) while Chinese attribute their successes and failures to effort (e.g., Hau & Salili, 1991). Additionally, while American culture tends to emphasize personal achievement as a learning goal, Chinese culture emphasizes social contribution and de-emphasizes individual achievements (Li, 2002; Li & Wang, 2004). In fact, Singaporean Chinese define success as individual competence in socially recognized projects, placing importance on both individual and collective achievement (Chang et al., 2000). Because of these cultural differences, theorists have suggested that students socialized in Euro-American culture treat low achievement (in themselves or exemplified in peers) as direct threats to their self-esteem, while students socialized in Chinese culture are less threatened by poor performances (Covington, 1992; Li & Wang, 2004). It is possible that the Singaporeans possess fewer inhibitions than Americans for expressing liking for negative role models, hence explicit FF predicted liking of the unsuccessful interviewee in Study 2, but not in Study 1. Cultural norms for the treatment of negative role models could also explain why implicit HS predicted liking of the unsuccessful interviewee in Study 2. For instance, Lockwood, Marshall, and Sadler (2005) found that Asian Canadian students were more motivated by negative role models while European Canadian students were more motivated by positive role models. Perhaps the unsuccessful interviewee possessed some intrinsic incentive value for achievement in the Singapore academic context, for instance, by providing information about which strategies should be avoided in order to prevent social disruption. However, the exact process through which achievement-motivated Singaporeans might be more aroused by negative versus positive role models is unexplored, and it is equally possible that the relationship between implicit HS and liking of the unsuccessful interviewee is due to some idiosyncratic quality of the sample; hence more research is needed to clarify this particular finding.

Another finding that deserves further discussion is that implicit FF predicts recognition memory for the unsuccessful interviewee but not recall memory in Study 2. There is good evidence that recall and recognition memory implicate different brain regions and retrieval processes (Cabeza, Kapur, Craik, & McIntosh, 1997; Quamme, Yonelinas, Widaman, Kroll, & SauvÃ©, 2004; Tsivilis et al., 2008). There is also evidence that people possess selective memories about positively- and negatively-valenced information, to the extent that they exhibit enhanced recall and recognition for positively-valenced material (Monnier & Syssau, 2008) and poorer recall for negatively-valenced material (Green, Sedikides, & Gregg, 2008). Additionally, although participants in Green et al.'s study exhibited poorer recall of negatively-valenced material, their recognition of the same material was unimpaired. It seems there is a bias for people to selectively forget negatively-valenced material, and this bias is more prevalent in recall memory; the differing results for recall and recognition memory for the unsuccessful interviewee could have been subject to the same cognitive biases. In any case, our findings show that people's reactions to negative role models are quite complicated, and a comprehensive analysis should involve motivational as well as contextual factors.

We also observed some interesting relationships between explicit achievement motives and students' self-evaluations of performance. HS-motivated participants had higher self-efficacy than FF-motivated participants as they rated themselves comparatively better-performing than either of the interviewees whereas FF-motivated participants rated themselves worse-performing. Additionally, students who remembered more information about positive role models were less likely to rate themselves favorably in comparison to these peers while those who remembered more about negative role models were more likely to rate themselves comparatively more favorably. This shows the importance of person (motives) and situation (access to social-comparative information in one's memory) factors in determining students' self-evaluations of performance. To further examine the role of social comparison, follow-up studies could vary the relevance to Self of social information (the less relevant to Self, the less likely social comparison is occurring, and the less the effect on self-efficacy).

Our general finding that achievement motives affect reactions to peers lends support to Murray's (1938) original conception of needs as internal directional forces that determine how people seek out or respond to stimuli in the environment. Additionally, the present research suggests how knowledge about implicit motives can contribute to a better understanding of observable social behavior in achievement settings. The implicit achievement motive has traditionally been studied as an "autistic" motive, whereby autonomy is viewed as a pre-condition for the development of high motivation (c.f., McClelland, 1961). Our findings suggest that achievement motivation also affects consumption of social information, particularly in a University environment where achievement standards are continually being invoked. Furthermore, people selectively remember more if the material is directly relevant to the achievement domain, perhaps because such information is motivationally more relevant.

Our research also points to a potential area of convergence for the influence of implicit and explicit motives: Implicit and explicit HS both predict attentional and attitudinal biases for the successful peer while implicit and explicit FF both predict biases for the unsuccessful peer. Thus, our work follows a tradition of research by Thrash, Elliot, and colleagues that implicate implicit and explicit motives with more contextualized regulatory constructs, such as goals. Elliot and McGregor (2001) proposed a model in which achievement motives are distal predictors and achievement goals are context-specific, proximal predictors of achievement outcomes and behavior. In this framework, explicit and implicit motives both

contribute to goal adoption, which in turn predicts achievement behavior (Elliot & McGregor, 2001; Thrash & Elliot, 2002). We support Thrash and Elliot (2002) view that goal adoption depends on the relative strength of implicit and explicit motives as well as the type of incentives present in the context that are relevant to each motivational orientation. Additionally, we propose that reaction to peer achievement represents another mid-level, context-specific, regulatory construct that is affected by both implicit and explicit motives. As our findings suggest, implicit and explicit motives predict similar attitudinal and cognitive preferences towards achieving and non-achieving peers, and factors such as whether the material is relevant to the achievement domain and cultural norms about competence also affect participants' reactions.

It is interesting to note the marginally significant, modest negative correlation between implicit and explicit HS in Study 2. To our knowledge, no other study has been conducted on an Asian sample which includes implicit and explicit motives in the same study; more research is needed to ascertain the significance of this correlation. However, based on previous findings that implicit motive and explicit motive and goal incongruence lead to lower subjective well-being (Baumann, Kaschel, & Kuhl, 2005; Kehr, 2004; Schultheiss & Brunstein, 1999), one might speculate that this negative correlation could result in well-being or performance deficits for the Singapore students, particularly if they pursue social interactions that are congruent with their explicit motives but incongruent with their implicit motives, or vice versa.

Our research is consistent with the classic personality psychology perspective that individuals affect their social environment by their reactions to, selection of, and manipulation of elements in the environment. This work represents a first step towards exploring how personality and situation interact in determining how achievement-motivated individuals seek out and utilize social information in achievement settings.

Acknowledgments

We would like to thank Oliver C. Schultheiss and Cynthia M. Torges for conceptual and statistical advice, and Torrie Hoffmeyer, Wei-wen Ng, Lisa Zakaria, Keli Rulf, Adam Siroky, Ashley Franks, Rena Menke, and Cindy Chuang for help in data collection. We would also like to thank two anonymous reviewers for helpful comments on the conceptualization of the research. Yammie S. Chin completed a portion of this research with partial financial support from the Undergraduate Research Experience on Campus programme at Nanyang Technological University.

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