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Gender Differences in Social Mastery Motivation and its Relationships to Vocabulary
Knowledge, Behavioral Self-regulation, and Socioemotional Skills

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Authors' Notes

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Abstract

The present study investigated gender differences in social mastery motivation, vocabulary knowledge, behavioral self-regulation, and socioemotional skills and examined the relationships between these knowledge and skills across the gender groups. Participants were 134 Chinese children (68 boys, mean age 3.80; 66 girls, mean age 3.89) and their parents recruited through local kindergartens' parent groups. These children were administered measures of social mastery motivation, vocabulary knowledge, behavioral self-regulation, and non-verbal intelligence. Parents reported their educational level and children's socioemotional skills. Results revealed that boys exhibited more social mastery interactions than girls, and girls showed better behavioral self-regulation and socioemotional skills than boys. Girls with higher social mastery interaction frequency demonstrated better vocabulary knowledge and socioemotional skills, whereas boys with higher social mastery interaction frequency showed lower behavioral self-regulation. Boys, who showed more positive affect during social mastery interactions, tended to have better expressive vocabulary, which facilitated their behavioral self-regulation. Findings highlight social mastery motivation as a potential factor that facilitates children's early development, but it may contribute to boys and

girls in different ways.

Keywords: social mastery motivation, kindergarten children, vocabulary knowledge,

behavioral self-regulation, socioemotional skills, gender differences

Gender Differences in Social Mastery Motivation and its Relationships to Vocabulary Knowledge, Behavioral Self-regulation, and Socioemotional Skills

Despite some evidence connecting behavioral self-regulation, vocabulary knowledge, and socioemotional skills, little research has included either gender or social mastery motivation into the investigation in young children. It has been suggested that children's social mastery motivation acts as a facilitator of their vocabulary knowledge (Pipp-Siegel, Sedey, VanLeeuwen, & Yoshinaga-Itano, 2003), and that girls may show more social behaviors in play situations (Marjanovič-Umek & Fekonja-Peklaj, 2017). Growing evidence has also suggested gender differences in preschoolers' vocabulary knowledge, behavioral self-regulation, and socioemotional skills, in favor of girls (e.g., Allan, Joye, & Lonigan, 2017; Bosacki & Moore, 2004; Montroy, Bowles, Skibbe, McClelland, & Morrison, 2016). However, research on this area has been mainly conducted in Euro-American countries and the studies seldom take social mastery motivation into consideration. The present study examines whether and how social mastery motivation, vocabulary knowledge, behavioral self-regulation, and socioemotional skills are interrelated in Cantonese-speaking children in Hong Kong. The first question asks whether there are gender differences in social mastery motivation, vocabulary knowledge, behavioral self-regulation, and socioemotional skills. The second question then arises if there are differences in the relationships among social mastery

motivation, vocabulary knowledge, behavioral self-regulation, and socioemotional skills

across the gender groups.

Social Mastery Motivation

Mastery motivation is the psychological force that drives children to master moderately challenging tasks and skills (Wang, Hwang, Liao, Chen, & Hsieh, 2011). In addition to object mastery motivation that is defined as persistence directed toward inanimate objects, children are also motivated to explore their social environment (Wang et al., 2011). Social mastery motivation is defined as one's desire to start, maintain, and control social interaction processes so as to obtain satisfaction from social interaction or objects/information from the social partner (MacTurk, Hunter, McCarthy, Vietze, & McQuiston, 1985), and it is operationalized as the amount of active social interactions (i.e., child-initiated or -maintained interactions) and positive emotion (i.e., positive affect) expressed during play (Combs & Wachs, 1993). Children differed in their ability to integrate object- and social-mastery behaviors (MacTurk et al., 1985) and those with higher social mastery motivation tend to direct attempts at mastery toward their social partner (Wachs & Combs, 1995). Although children seem to express more social-mastery behaviors in social play than in object play, the difference was suggested as artificial (Combs & Wachs, 1993).

Empirical evidence has documented links between children's mastery motivation and their developmental outcomes (e.g., Gilmore, Cuskelly, & Purdie, 2003; Messer, et al., 1986),

but most of the studies focused on object-mastery behaviors (MacTurk, 1993). Only a few studies provided evidence that children's social mastery motivation was associated with their vocabulary knowledge, and Pipp-Siegel et al. (2003) proposed that children with higher social mastery motivation would make a greater effort in communicating with social partners, which leads to better vocabulary knowledge (with both receptive and expressive vocabulary) that reinforce their further social-mastery behaviors. Little research has investigated how children's social mastery motivation is linked to their vocabulary knowledge and other related developmental outcomes, and those focusing on Chinese children across the gender groups have been even rarer. In response to the call of examining the impact of children's personal characteristic on their developmental outcomes (Fay-Stammbach, Hawes, & Meredith, 2014), we examine whether social mastery motivation is a factor relating to the individual differences in vocabulary knowledge, behavioral self-regulation, and socioemotional skills.

Gender Differences in Vocabulary Knowledge, Behavioral Self-regulation, and

Socioemotional Skills

Several lines of research suggest that behavioral self-regulation, socioemotional skills, and vocabulary knowledge are overlapping developmental processes (Salmon, O'Kearney, Reese, & Fortune, 2016). In a recent review regarding the relationships between children's language, self-regulation, and emotional knowledge, Salomon et al. (2016) suggested that vocabulary knowledge is a robust indicator of preschool children's language skills and that

vocabulary knowledge is the foundation of their behavioral self-regulation and socioemotional development. First, research has shown that vocabulary knowledge contributes to behavioral self-regulation (e.g., Bohlmann, Maier, & Palacios, 2015; Petersen, Bates, & Staples, 2015), which is viewed as the combined construct of executive functioning and effortful control (Bridgett, Burt, Edwards, & Deater-Deckard, 2015). Children with better vocabulary knowledge may demonstrate advanced behavioral self-regulation as they have better mental representation of a problem (Zelazo, 1999) and have more mental resources (Vygotsky, Hanfmann, & Vakar, 1962) in coordinating their executive functioning processes of inhibitory control (to suppress non-adaptive response), working memory (to hold and manipulate information in mind), and attention shifting (to direct focus on appropriate target) (Chung, Lam, & Cheung, 2017). Better vocabulary knowledge can also enhance children's abilities to internalize verbal instructions (Vallotton & Ayoub, 2011) and verbal mediation (Alderson-Day & Fernyhough, 2015) that help them to suppress a dominant response and execute a subdominant response, which are the core skills of effortful control (Kochanska, Murray, & Harlan, 2000). Second, research has also demonstrated the links between vocabulary knowledge and socioemotional skills (Salmon et al., 2016), which include the abilities in interpreting, reasoning, and managing emotions (McKown, Gumbiner, Russo, & Lipton, 2009) and responding constructively to social contexts (Jeon, Wall, Peterson, Luze, & Swanson, 2017). Children with better vocabulary knowledge are more effective in describing

and understanding internal feelings (Nelson, 2007). Vocabulary knowledge can also support children's emotional understanding (e.g., Beck, Kumschick, Eid, & Klann-Delius, 2012; Salmon et al., 2013), which enables them to develop good interpersonal relationships and contributes to their socioemotional skills (Salmon et al., 2016).

Given the close connections between vocabulary knowledge, behavioral self-regulation, and socioemotional skills (Salmon et al., 2016), some studies have reported the consistent pattern of gender differences in relation to the three skills among preschool children. For example, research has shown that girls demonstrated better vocabulary knowledge than boys when entering the preschool (e.g., Allan et al., 2017; Barbu et al., 2015; Wallentin, 2009), but the effect of gender seemed to diminish after the age of three (Simonsen, Kristoffersen, Bleses, Wehberg, & Jørgensen, 2014) and girls' advantages were likely to disappear beyond the age of six (Bornstein, Hahn, & Haynes, 2004). Emerging evidence has also suggested that preschool girls outperformed boys in both behavioral self-regulation (e.g., Matthews et al., 2009; Montroy et al., 2016) and socioemotional skills (e.g., Bosacki & Moore, 2004; Graves et al., 2012). Specifically, preschool girls were better in understanding and naming emotion (Bosacki & Moore, 2004), and had more advanced social skills than boys (Graves et al., 2012). Similarly, at the beginning of or during the preschool years, more boys were reported as late-developer of behavioral self-regulation than girls (Montroy et al., 2016). Gender difference in behavioral self-regulation, however, was mostly reported by studies conducted

in the United States; and the difference may be less apparent in Asian societies (Wanless et al., 2013). It remains unclear whether gender difference in behavioral self-regulation is universal.

Taken together, social mastery motivation may influence one's vocabulary knowledge through daily communication, which affects one's behavioral self-regulation and socioemotional skills. As preschool girls are more likely to demonstrate social behaviors than boys during play (Leung, 2014; Marjanovič-Umek & Fekonja-Peklaj, 2017), girls could have greater social mastery motivation than boys. Moreover, given the consistent pattern of gender differences in vocabulary knowledge, behavioral self-regulation, and socioemotional skills, the relationships between these knowledge and skills could be stronger in girls than in boys. These two research questions were examined in the present study.

The Present Study

This study investigated gender differences in social mastery motivation, vocabulary knowledge, behavioral self-regulation, socioemotional skills, and the relationships among the variables in Chinese children between 3 and 5 years. Based on the existing theories and findings (Allan et al., 2017; Graves et al., 2012; Marjanovič-Umek & Fekonja-Peklaj, 2017; Montroy et al., 2016; Pipp-Siegel et al., 2003; Salmon et al., 2016), we first hypothesized that girls would show a higher level of social mastery motivation and have better vocabulary knowledge, behavioral self-regulation, and socioemotional skills than boys. Second, we

anticipated that girls would have stronger positive relationships among social mastery motivation and vocabulary knowledge, behavioral self-regulation, and socioemotional skills than boys.

Method

Participants

Participants were 134 Hong Kong children (66 girls, mean age 3.89; 68 boys, mean age 3.80) and their parents recruited through local kindergartens' parent group, with Cantonese as their first language. The families were located in 14 geographical districts in Hong Kong. Mothers and fathers reported their education levels with a 4-point scale: 1 primary school; 2 secondary school; 3 bachelor's degree; 4 postgraduate degree, and the mean education level was used as an estimate of the socioeconomic status (Schmitt, Pratt, & McClelland, 2014). The mean of parental education attainment was 2.84 ($SD = .65$), with no significant gender difference ($t(132) = 0.29, p > .05, d = .05$).

Procedure

Assessment measures of social mastery motivation, receptive vocabulary, expressive vocabulary, verbal working memory span, spatial working memory span, executive functioning, effortful control, and non-verbal intelligence were administered to individual children at their own home. Parents were also asked to fill in their educational level and their children's socioemotional skills. Informed consent was obtained from parents before the start

of the assessment.

Measures

Social Mastery Motivation

To avoid artificial introduction of social interaction via social play (Combs & Wachs, 1993) that could contaminate the research findings and to achieve better control over experimenter's behaviors, children's social mastery motivation was assessed by two object play tasks with reference to previous research (Gilmore et al., 2003). The first task was the jigsaw puzzle. Six puzzles with varying difficulty levels were prepared for children. Based on the experience from the pilot run, each child was first provided with an age-appropriate puzzle and was asked to complete the puzzle according to a reference photo within three minutes. If the child finished by one and a half minutes, a harder puzzle was given. If no part was completed within one and a half minutes, an easier puzzle was given. In either case, the child was given another three minutes to complete the new puzzle. The second task was the "Lego" block building. The child was told to build the blocks according to a reference photo (i.e., with a car, a chair, two fences, two children figures, and one dog figure). The dog and children figures were intentionally kept in a transparent plastic bag and placed before the child. In both play tasks, experimenter kept sitting next to the child silently and responded only to any child-initiated interaction. The experimenter initiated verbal interaction only in specific situations to check task completion.

Child's behaviors in the two tasks were videotaped and coded according to the frequency code scheme as employed in previous study (Combs & Wachs, 1993), which included child-initiated interaction (verbal or non-verbal behavior that was directed towards the experimenter, as indicated by child's eye-contact or content of verbal expression), child-maintained interaction (verbal or non-verbal behavior aimed to sustain an interaction with the experimenter that had existed within three seconds immediately before the considered action), passive interaction (non-verbal behavior, such as look without affect or vocalization, directed towards the experimenter), and positive affect (laugh or smile while having active interaction with the experimenter), with frequencies of child-initiated and child-maintained interactions combined to reflect frequency of active interaction. Two experienced assistants were trained for the coding, with 10% of the cases randomly selected to estimate the inter-rater reliability. The intra-class correlations of active interaction, child-initiated interaction, passive interaction, and positive affect were .88, .84, .75, and .81, respectively.

Socioemotional Skills

Children's socioemotional skills were assessed by items adapted from the Heep Hong Society Development Assessment Chart (HHSDAC; Heep Hong Society, 2006). HHSDAC was a reliable and valid measure of socioemotional skills of preschoolers from Hong Kong according to a local study conducted by the Heep Hong Society. Eight items from the emotional performance subscale (e.g., "use appropriate means to relieve negative emotion",

“verbally express the underlying reason of emotion”) and five items from the social communication subscale (e.g., “develop friendships with some peers”, “verbally express daily experience in detail”) were employed, with both parents rated on a 5-point Likert scale ranging from 1 (never) to 5 (always). The total average score represented the socioemotional skills. The Cronbach’s alpha was .89.

Vocabulary Knowledge

The average of standardized scores of both receptive vocabulary and expressive vocabulary tests represented children’s vocabulary knowledge.

Receptive Vocabulary Children’s receptive vocabulary was assessed by items adapted from the Cantonese Receptive Vocabulary Test (Cheung, Lee, & Lee, 1997). Twenty-five items were evenly extracted from the test according to their difficulty levels. To raise the discriminative power, one difficult item was added to the list (Ho, Leung, & Cheung, 2011). A pilot study was conducted to verify the appropriateness of the items. For each item, the experimenter verbally presented the target vocabulary and the child was asked to point out the answer from four choices (i.e., the target, one semantic distractor, one phonological distractor, and one unrelated object). One point was given to each correct choice, with a maximum of 26. The Cronbach’s alpha was .65.

Expressive Vocabulary A list with twenty vocabularies was created with reference to the previous measure (Ho et al., 2011). Textbooks from three local kindergartens were

reviewed and twenty common vocabularies in increasing order of conceptual difficulty were selected. A pilot study was performed to confirm the appropriateness of the items. For each item, the child was shown with a picture (e.g., spoon) and asked to describe what it is and its function. A scoring scheme was prepared for the coders based on results from the pilot study, which covered the target vocabulary, relevant function, and sample answers for the partial score. Two marks were given for each correct vocabulary or function, whereas one mark was given if a relevant but ambiguous vocabulary or function was mentioned. The maximum score was 80. The Cronbach's alpha was .82, and the intra-class correlation was .96.

Behavioral Self-regulation

The average of standardized scores of executive functioning, effortful control, spatial- and verbal-working memory span represented children's behavioral self-regulation.

Executive Functioning Children's executive functioning was assessed by the head-toes-knees-shoulders task (HTKS; McClelland et al., 2014) [which was used from previous studies \(Chung, Liu, McBride, Wong, & Lo, 2017; Liu et al., 2018\)](#). The first and second sections of HTKS were employed. The child was told to play a game by acting in opposite way according to experimenter's instruction. In section one, two rules were used (i.e., touch your head/toes). After six practice items with feedback on correctness, there were ten assessing items based on the two rules. In section two, two additional rules were introduced (i.e., touch your shoulders/knees). After five practice items, there were ten assessing items

based on all four rules. Two marks were given to a correct response, one mark was awarded to a self-corrected response, and zero mark was given to incorrect response. The maximum score was 62. The Cronbach's alpha was .96, and the intra-class correlation was .99.

Effortful Control Children's effortful control was assessed by the wrapped gift task (Chang, Shaw, Dishion, Gardner, & Wilson, 2015). Experimenter first told the child that a gift was brought but without wrapping. Then, the child was told to sit on a chair that was facing away from the experimenter while the experimenter was wrapping the gift noisily for three minutes. Child's latency to first peeking and peeking duration were coded. Both latency and reversed peeking duration were included in the aggregated score of behavioral self-regulation. The intra-class correlations of latency and reversed peeking duration were .85 and .95, respectively.

Spatial- and Verbal-Working Memory Span Children's spatial working memory span was assessed by the Wechsler Memory Scale-Third Edition spatial task (Wechsler, 1997). First, the child was asked to memorize the sequence of blocks touched by the experimenter at a rate of one per second. Then, the child was told to touch the blocks based on the recalled sequence. Span level increased from one to five blocks, with two different sequences on each level. Children's verbal working memory span was assessed by the simple span recall task (Archibald & Griebeling, 2016). First, the child was told to remember a sequence of digits verbally presented by the experimenter at a rate of one per second. Then,

the child was asked to repeat the digits. Span level increased from one to eight digits, with three different sequences on each level. In both tasks, the experimenter ended the session if the child failed to recall any single sequence at a span level. Child's span length was the level that s/he recalled at least one sequence successfully. The Cronbach's alphas of spatial- and verbal-working memory span were .83 and .92, respectively.

Non-verbal Intelligence

Children's non-verbal intelligence was assessed by sets A and A_B of the Raven's Coloured Progressive Matrices (Raven, 1998), with a total of 24 items. In each item, the child was provided with a picture showing a matrix that had a missing part. The child was told to select the part from six choices that could complete the matrix. One mark was given for each correct choice.

Results

Table 1 shows the descriptive statistics and bivariate correlations among study variables by gender. Independent samples T-tests were conducted to compare the mean differences between boys and girls. Contrary to our expectation, in the two social mastery play tasks, boys ($M = 17.31$, $SD = 14.36$) exhibited more active interaction than girls ($M = 8.30$, $SD = 9.79$), $t(118.50) = -4.25$, $p < .001$, $d = -.73$. Boys ($M = 9.87$, $SD = 7.26$) also initiated more social interaction than girls ($M = 5.21$, $SD = 5.96$), $t(132) = -4.05$, $p < .001$, $d = -.70$. However, girls ($M = 2.86$, $SD = 3.54$) displayed more passive interaction than boys ($M =$

1.65, $SD = 2.29$), $t(110.76) = 2.35$, $p < .05$, $d = .41$. For outcome variables, girls ($M = .27$, $SD = .73$) demonstrated better behavioral self-regulation than boys ($M = -.16$, $SD = .58$), $t(115) = 3.56$, $p < .001$, $d = .66$. Girls ($M = 3.70$, $SD = .48$) also demonstrated better socioemotional skills than boys ($M = 3.49$, $SD = .43$), $t(123) = 2.58$, $p < .05$, $d = .46$. No other significant gender difference was found. Against our first hypothesis, boys showed higher level of social mastery interaction than girls; while the difference in vocabulary knowledge was insignificant. Girls showed better behavioral self-regulation and socioemotional skills than boys, which concur with the first hypothesis.

In Table 1, as expected, girls' active social mastery interaction frequency was positively associated with their socioemotional skills ($r = .30$, $p < .05$) and, at a trend level, with their receptive vocabulary ($r = .22$, $p < .10$). Girls' passive interaction frequency was negatively correlated with their expressive vocabulary ($r = -.28$, $p < .05$). For boys, positive affect frequency during social mastery interaction was positively correlated with expressive vocabulary ($r = .28$, $p < .05$); however, no significant relationship was found among active social mastery interaction frequency, vocabulary knowledge, and socioemotional skills (all $r_s < .04$, all $p_s > .05$). Unexpectedly, boys' child-initiated social mastery interaction frequency was negatively related to their behavioral self-regulation ($r = -.33$, $p < .01$), whereas such a relationship was non-significant in girls ($r = -.01$, $p > .05$). Age (for boys, all $r_s > .26$, all $p_s < .05$; for girls, all $r_s > .47$, all $p_s < .01$) and non-verbal intelligence (for boys, all $r_s > .26$, all

$ps < .05$; for girls, all $rs > .44$, all $ps < .01$) were positively associated with receptive vocabulary, expressive vocabulary, and behavioral self-regulation in both boys and girls.

Although the mean for parental education was only negatively related to boys' socioemotional skills ($r = -.27, p < .05$), it was still entered as a control variable, along with age and non-verbal intelligence, in further analyses.

Hierarchical regression analyses were performed to determine how social mastery motivation predicted vocabulary knowledge, behavioral self-regulation, and socioemotional skills in boys and girls separately. Under all the regression analyses, the variables of child age, non-verbal intelligence, and parental education were entered in step 1 to control for plausible confounding factors. In the remaining steps, additional predictors were entered to examine the predictive roles in various outcome variables. In Table 2, the control variables in step 1 were non-significant predictors of boys' and girls' socioemotional skills. In step 2, active social mastery interaction frequency significantly explained 8% unique variance in girls' socioemotional skills, but not in boys. Also, as shown in Table 2, the control variables in step 1 significantly accounted for 30% and 43% of the variance in boys' and girls' vocabulary knowledge, respectively. In step 2, active social mastery interaction frequency additionally explained 6% of the variance in girls' vocabulary knowledge, but not in boys. Although boys' social mastery interaction frequency was not associated with their vocabulary knowledge, positive affect frequency was positively linked with expressive vocabulary (Table

1). Regression analysis was conducted by using positive affect frequency during interaction as the predictor of expressive vocabulary, and Table 3 shows the standardized coefficients. In step 1, the control variables significantly explained 17% and 39% of the variance in boys' and girls' expressive vocabulary, respectively. In step 2, positive affect frequency during social mastery interaction accounted for, at a trend level, 3% unique variance in boys' expressive vocabulary, but not in girls. Finally, in Table 4, the control variables in step 1 significantly explained 39% of the variance in girls' behavioral self-regulation, but not in boys. In step 2, expressive vocabulary was entered based on statistical and theoretical reasons, and this predictor positively explained for 10% unique variance in boys' behavioral self-regulation, but not in girls. In step 3, child-initiated social mastery interaction frequency turned out to be a negative predictor that explained 7% unique variance in boys' behavioral self-regulation, but not in girls. In sum, girls' social mastery interaction frequency was positively associated with their vocabulary knowledge and socioemotional skills, whereas no such relationship was found for boys. Contrary to the second hypothesis, boys' social mastery interaction frequency was negatively related to their behavioral self-regulation, whereas null relationship was found for girls.

Discussion

The present study investigated gender differences in social mastery motivation, vocabulary knowledge, behavioral self-regulation, and socioemotional skills and explored the

relationships between these knowledge and skills across the gender groups in Chinese children aged 3 to 5 years. This study examines how social mastery motivation was related to vocabulary knowledge, behavioral self-regulation, and socioemotional skills differently in boys and girls. Concurred with the first hypothesis, girls showed higher behavioral self-regulation and socioemotional skills than boys. Contrary to the first hypothesis, boys exhibited higher social mastery interaction frequency than girls. Although boys displayed more social interaction during the play tasks, boys' social mastery interaction frequency was neither associated with their vocabulary knowledge nor socioemotional skills, whereas girls' social mastery interaction frequency was positively related to their vocabulary knowledge and socioemotional skills. These results were partially consistent with the second hypothesis. Furthermore, girls' social mastery interaction frequency was not related to their behavioral self-regulation, whereas a negative relationship was found for boys.

Gender Differences in Social Mastery Motivation, Vocabulary Knowledge, Behavioral Self-regulation, and Socioemotional Skills

As predicted, girls demonstrated better behavioral self-regulation and socioemotional skills than boys. The present findings extended prior works on the important role of gender on behavioral self-regulation in Asian society. However, gender difference in vocabulary knowledge was insignificant. Given that participants in this study were aged from three to five, the results concurred with previous findings showing that girls' advantage on vocabulary

knowledge may reduce between three and six years (Bornstein et al., 2004; Simonsen et al., 2014).

Relationships among Social Mastery Motivation, Vocabulary Knowledge, Behavioral Self-regulation, and Socioemotional Skills in Girls

Consistent with our expectation, girls who exhibited more social mastery interaction demonstrated better vocabulary knowledge and socioemotional skills. Children with higher social mastery motivation have a greater desire to communicate effectively with their social partner (Combs & Wachs, 1993; Pipp-Siegel et al., 2003), and they are more likely to initiate (e.g., asking questions) and maintain (e.g., seeking for explanations) verbal interactions.

Consequently, the increased verbal interactions may enhance children's early language exposure which may further contribute to their vocabulary knowledge (Salmon et al., 2016).

Children with higher social mastery motivation could also create more opportunities to practice their social interaction and emotion understanding skills and to obtain social information by referring to their social partner's feedback (MacTurk et al., 1985). The results suggested that social mastery motivation was an individual factor that potentially contributed to vocabulary knowledge and socioemotional skills in girls, above and beyond the effects of age, non-verbal intelligence, and parental education.

Girls' social mastery motivation, however, was not associated with their behavioral self-regulation. First, as this study is cross-sectional in nature, it does not blot out the possibility

that social mastery motivation might influence girls' subsequent behavioral self-regulation development. Second, although girls' social mastery motivation could have a positive impact on their vocabulary knowledge, their behavioral self-regulation might be less dependent on expressive vocabulary compared to boys. Research on vocabulary knowledge and behavioral self-regulation has provided inconsistent findings (e.g., Gooch, Thompson, Nash, Snowling, & Hulme, 2016; Petersen et al., 2015), and expressive vocabulary was suggested to be more important in determining the developmental trajectory of behavioral self-regulation in preschool boys than in girls (Valloton & Ayoub, 2011). Consistently, results from the hierarchical regression revealed that expressive vocabulary was a positive predictor of boys' behavioral self-regulation only. Future research should be conducted to verify these findings.

Relationships among Social Mastery Motivation, Vocabulary Knowledge, Behavioral Self-regulation, and Socioemotional Skills in Boys

In contrast, although boys were exhibiting higher frequency of active social mastery interaction than girls, their social mastery interaction frequency was not associated with vocabulary knowledge or socioemotional skills, but negatively related to behavioral self-regulation. The findings suggested that boys' social mastery interaction frequency per se **had no positive relationship with** their knowledge in vocabulary (as occurred with girls), and that boys' social mastery interaction might not be perceived by their parents as pro-social (as it may be in girls). A possible explanation might be boys' heightened level of impulsivity (e.g.,

Chapple & Johnson, 2007; Olino, Durbin, Klein, Hayden, & Dyson, 2013). Boys with higher impulsivity tend to spend less time in interpreting the situation when they are placed in problem-solving tasks (Puustinen, Kokkonen, Tolvanen, & Pulkkinen, 2004). Therefore, during the social mastery play tasks, impulsive boys might show less self-reflection and be more likely to express their need for help (e.g., “I don’t know how to do it”). These verbal interactions, however, could still be categorized as social-mastery behavior, with the aims of effectively communicating with and having an effect on the social partner (Combs & Wachs, 1993). Conversely, as higher impulsivity could lead to decreased cognitive functioning such as working memory (e.g., Papaioannou et al., 2016; Tibu et al., 2016), boys’ impulsive temperament might hinder their general cognitive performance when they were having social interaction, which dampened the beneficial effects of social mastery motivation on vocabulary knowledge. Boys’ impulsivity might also adversely affect how their social-mastery behaviors are perceived by their parents, which in turn might affect parents’ rating on socioemotional skills and how parents responded to the boys. The above argument was supported by the findings that boys’ child-initiated interaction frequency was negatively related to their behavioral self-regulation. Executive functioning in preschoolers seems to be a unitary construct (Wiebe, Espy, & Charak, 2008); thus measurements may chiefly tap into the inhibitory control aspect (McClelland et al., 2014). Boys who initiated more social mastery interaction due to their heightened impulsivity would score lower in behavioral self-

regulation as they were incapable of restraining their behaviors. Further study should investigate how social mastery motivation and impulsivity interact to affect children's early development.

The Role of Social Mastery Positive Affect in Boys' Expressive Vocabulary and Behavioral Self-regulation

Although boys' social mastery interaction frequency **was not related to** their vocabulary knowledge or socioemotional skills, boys who tended to exhibit more positive affect during social interaction demonstrated better expressive vocabulary, which was positively related to their behavioral self-regulation. Conceptually, positive affect is an aspect of mastery motivation (Wang et al., 2011) which indicates pleasure derived from the mastery behaviors (Wachs & Combs, 1995). Positive affect might reflect that the goal behinds the social-mastery behavior could trend towards the enjoyment of the interacting experience, instead of solely towards the obtaining of objects or information due to one's impulsivity (MacTurk et al., 1985). Moreover, boys who exhibited more positive affect might be able to improve how their social-mastery behaviors were perceived by their parents, and thus, evoke more contingent responses. Through the improved parent-child interaction processes, boys' expressive vocabulary might be enhanced, which in turn might facilitate their behavioral self-regulation. The results highlighted the importance to include positive affect in assessing social mastery motivation and suggested a plausible pathway to improve boys' expressive

vocabulary and behavioral self-regulation.

Limitations and Conclusions

This study had a number of limitations. First, participants were recruited through local kindergartens' parent group based on personal network and snowball sampling. Although they were located in 14 geographical districts out of a total of 18 in Hong Kong and were diverse in socioeconomic status, the generalizability of the findings is still limited and could be improved by using a systematic approach to recruit kindergartens with high, middle, and low socioeconomic backgrounds evenly. Second, this is a cross-sectional study which provides no causal inference from the findings. Longitudinal studies could better serve the purpose of making the causal inference regarding how social mastery motivation would affect vocabulary knowledge, behavioral self-regulation, and socioemotional development in boys and girls. Third, it was suggested that children's social mastery motivation depends on the social context and identity of the social partner (Combs & Wachs, 1993). This study assessed children's social mastery motivation by employing a standardized play approach with a single experimenter (i.e., a stranger) to control for confoundings such as parent-child relationship or different behavioral response due to multiple experimenters. This approach, however, limited the generalizability of the findings. Future research may also include measures on social mastery motivation directed towards parent or peer. [Lastly, although an integrative approach of executive functioning included the measures of HTKS, verbal working memory span, and](#)

spatial working memory span is used for this study, future research may incorporate other measures of children's cognitive abilities such as cognitive shifting and emotional self-regulation to further examine the role of social mastery motivation in vocabulary knowledge, behavioral self-regulation, and socioemotional skills across genders and cultures.

In sum, this study provided theoretical insights into the literature by showing gender differences in social mastery motivation and behavioral self-regulation, and revealing how social mastery motivation was associated with boys' and girls' vocabulary knowledge, behavioral self-regulation, and socioemotional skills differently. Presumably, girls with higher social mastery motivation could sharpen their vocabulary knowledge and socioemotional skills by having more social interactions; whereas only those social-mastery behaviors with positive affect would benefit boys' expressive vocabulary and behavioral self-regulation. Future research should include social mastery motivation and gender to expand our knowledge of early childhood development. Practically, parents could facilitate children's development by encouraging their social-mastery behaviors, and providing boys with additional guidance to engage them in elaborative verbal interaction in a positive mood.

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Table 1

Descriptive statistics and bivariate correlations among study variables by gender

Variables	Girls		Boys		Correlations												
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1. Age	3.89	0.60	3.80	0.60	--	-.20	.38**	-.02	-.03	-.18	.03	.47**	.48**	.54**	.61**	.51**	.17
2. Parental education	2.86	0.70	2.82	0.60	-.32**	--	.22†	.01	.03	-.05	-.03	.06	.12	.11	.03	.04	-.06
3. Non-verbal intelligence	8.48	3.41	7.67	4.68	.60**	-.08	--	.03	-.01	-.04	.21†	.44**	.49**	.54**	.54**	.52**	.22†
4. SMM ^a Active Interaction	8.30 ₁	9.79	17.31 ₂	14.36	-.09	-.13	-.13	--	.96**	-.14	.56**	.22†	.11	.19	-.06	.00	.30*
Frequency																	
5. SMM ^a Child-initiated Interaction	5.21 ₁	5.96	9.87 ₂	7.26	-.07	-.09	-.12	.88**	--	-.14	.56**	.18	.10	.16	-.06	-.01	.30*
Frequency																	
6. SMM ^a Passive Interaction	2.86 ₁	3.54	1.65 ₂	2.29	-.10	.11	-.14	-.41**	-.39**	--	-.09	-.03	-.28*	-.18	-.17	-.06	-.09
Frequency																	
7. SMM ^a Positive Affect Frequency	2.17	3.62	3.03	4.12	.25*	-.38**	.11	.60**	.55**	-.31**	--	-.01	.10	.05	-.01	-.03	.23†
8. Receptive Vocabulary	17.92	3.05	18.06	3.07	.46**	-.01	.40**	-.10	-.13	-.01	.02	--	.52**	.87**	.49**	.47**	.08
9. Expressive Vocabulary	47.09	9.02	49.29	7.38	.36**	-.13	.35**	.01	-.04	.08	.28*	.33**	--	.88**	.66**	.54**	.19
10. Vocabulary Knowledge ^b	-0.04	0.89	0.11	0.76	.51**	-.08	.46**	-.06	-.11	.04	.17	.85**	.78**	--	.65**	.57**	.15
11. VWM ^c & SWM ^d sum	6.94	2.45	6.36	2.07	.42**	.20	.37**	-.19	-.27*	.14	.10	.34**	.37**	.43**	--	.83**	.21
12. Behavioral Self-regulation ^e	0.27 ₁	0.73	-0.16 ₂	0.58	.26*	.11	.26*	-.27*	-.33**	.17	-.00	.26*	.42**	.41**	.78**	--	.14
13. Socioemotional Skills	3.70 ₁	0.48	3.49 ₂	0.43	.19	-.27*	-.06	.04	.02	.00	.25*	.05	.24†	.17	.13	.08	--

Correlations for boys are reported below the diagonal; for girls, above. Means with different subscripts indicate significant gender differences, $p < .05$

** $p < .01$; * $p < .05$; † $p < .10$

^aSMM is social mastery motivation; ^bVocabulary knowledge is the average of standardized scores of receptive vocabulary and expressive vocabulary; ^cVWM is verbal working memory span; ^dSWM is spatial working memory span; ^eBehavioral self-regulation is the average of standardized scores of executive functioning, effortful control, verbal- and spatial-working memory span

Table 2

Hierarchical regression models of vocabulary knowledge and socioemotional skills by gender

		Vocabulary knowledge ^b								Socioemotional skills							
		Boys				Girls				Boys				Girls			
		<i>R</i> ²	ΔR^2	β	<i>t</i> value	<i>R</i> ²	ΔR^2	β	<i>t</i> value	<i>R</i> ²	ΔR^2	β	<i>t</i> value	<i>R</i> ²	ΔR^2	β	<i>t</i> value
Step 1	Age	.30	.30**	.36	2.55*	.43	.43**	.45	3.90**	.12	.12†	.22	1.35	.07	.07	.05	.34
	Non-verbal intelligence			.25	1.84†			.32	2.84**			-.22	-1.46			.22	1.45
	Parental education			-.00	-.07			.19	1.74†			-.23	-1.66			-.10	-.71
Step 2	SMM ^a active interaction frequency	.30	.00	-.00	-.02	.49	.06*	.24	2.51*	.12	.00	.01	.05	.15	.08*	.29	2.29*

** $p < .01$; * $p < .05$; † $p < .10$

^aSMM is social mastery motivation; ^bVocabulary knowledge is the average of standardized scores of receptive vocabulary and expressive vocabulary tests

Table 3

Hierarchical regression models of expressive vocabulary by gender

		Expressive vocabulary							
		Boys				Girls			
		<i>R</i> ²	ΔR^2	β	<i>t</i> value	<i>R</i> ²	ΔR^2	β	<i>t</i> value
Step 1	Age	.17	.17**	.18	1.19	.39	.39**	.44	3.73**
	Non-verbal intelligence			.23	1.58			.28	2.33*
	Parental education			-.11	-.87			.20	1.75†
Step 2	SMM ^a positive affect frequency	.20	.03†	.21	1.68†	.40	.01	.14	1.29

** $p < .01$; * $p < .05$; † $p < .10$

^aSMM is social mastery motivation

Table 4

Hierarchical regression models of behavioral self-regulation by gender

		Behavioral self-regulation ^b							
		Boys				Girls			
		<i>R</i> ²	ΔR^2	β	<i>t</i> value	<i>R</i> ²	ΔR^2	β	<i>t</i> value
Step 1	Age	.13	.13†	.26	1.58	.39	.39**	.40	3.15**
	Non-verbal intelligence			.12	.78			.35	2.76**
	Parental education			.21	1.56			.10	.83
Step 2	Expressive vocabulary	.23	.10**	.36	2.78**	.41	.02	.17	1.22
Step 3	SMM ^a child-initiated interaction frequency	.30	.07*	-.26	-2.26*	.41	.00	-.07	-.59

** $p < .01$; * $p < .05$; † $p < .10$

^aSMM is social mastery motivation; ^bBehavioral self-regulation is the average of standardized scores of executive functioning, effortful control, verbal- and spatial-working memory span